23500
796

Library

St. Olaf College

Northfield, Minn.

23500
796

GEORGE H. CORSAN, SR.

THE DIVING AND SWIMMING BOOK

978

BY

GEORGE H. CORSAN, Sr.

Author of "At Home in the Water," "Swimming Secrets," "Swimming Pool Pointers"

"Paddle your own canoe,
but first learn to swim!"

NEW YORK

A. S. BARNES AND COMPANY

1924

GV837
.C82

Copyright, 1924
by
M. C. Corsan

THIS BOOK IS DEDICATED

TO THE NINE HUNDRED AND NINETY-NINE PERSONS

OUT OF EVERY THOUSAND

WHO ARE INCOMPLETELY EDUCATED

IN THE ART OF SWIMMING

PUBLISHER'S NOTE

George H. Corsan, Sr., is the originator of the Massed Method of Swimming Instruction; of Rhythmic Breathing; of the Back Crawl Stroke; Fear Elimination Drill, etc. He holds the Award of Merit, R.L.S.S., 1899; he was made Professor of Swimming by the Ontario Teachers' Training School, and later received the same distinction from the Normal School of Physical Education of the Battle Creek Sanitarium. Since 1900, through his teaching and through his first book on swimming, "At Home in the Water," as well as articles in various magazines and newspapers and addresses before various Exchange, Rotary and Kiwanis Clubs, etc., his system of swimming instruction has been universally adopted and followed in the United States, in Canada, Australia and South America. Mr. Corsan's work has also included the designing of a great number of swimming pools.

Mr. Corsan is swimming instructor for the National Y.M.C.A., formerly the International Y.M.C.A., and has given swimming instructions in nearly every city in the country, as well as at the Y summer schools. He was formerly instructor at the University of Toronto, the Ontario Teachers' Training School, the Margaret Eaton School, Eaton Recreation Club, Toronto; at the War Training Camps in California, for the United States Government; Boy Scout Masters; Battle Creek Sanitarium; National Y.W.C.A.; Tidal Basin Bathing Beach, Washington, D. C.; Cincinnati Schools; Life Guards at Chicago, St. Louis, etc., etc.

The illustrations have been worked out in detail under the direction of Mr. Corsan. The photographs have been taken at different places. The drawings are by Mr. Albert Ben Wegener, Madison, N. J.; Mr. William Stevens and Mr. F. P. Williams, of New York.

FOREWORD

Swimming is an art so little understood by the mass of humanity throughout the world that we must look for the cause in man's structure. Man's structural adaptability is more for climbing trees than for either running on the plain or swimming in water: the shortest-legged dogs pass men on the run with ease; the two-legged ostrich and the two-legged kangaroos and wallabys make men look ridiculous in a race. Or consider the seal, which, resembling man in body but not in limbs, passes through the water so much more rapidly than the fastest human swimmer as to make the latter's best efforts appear snail-like in comparison. But as I myself can swim faster and better than any dog I have ever seen yet, it is evident that man can make great natatorial progress by scientific study of the art of swimming.

Any land animal, except man and some monkeys, when first thrown into the water will swim by setting up a running motion; watch a mouse, cat, dog, squirrel, or even a rabbit manoeuvre along the surface of the water. But the climbing actions of men and monkeys thrust them under, as the perpendicular position is the most dangerous position to assume in the water. If a man would just assume the horizontal and dog-paddle when first thrown into the water, instead of trying to clutch at the atmosphere with his hands, trying to climb out of the water, he would find he would get along all right and reach safety. A woman will yell all the air out of her lungs and twist and squirm until she strangles to death without sinking under the surface.

Between the unusual feats of the late Captain Webb, and of Monty Holbein, who swam the English Channel, and of Mrs. Clement Corson, the young Danish woman who swam down the Hudson from Albany to New York—between these and the average person whom we meet in the streets of our cities, there is far too great a gap; and it is in my endeavor to fill this gap that I put forth this work, with the hope that swimming will be made compulsory in every public school in the world within the next ten years so that in another quarter century we will hear of no more absurd drowning accidents.

In writing this book, I make nothing arbitrary, I do not claim perfection for it and the reader will use his own judgment about my methods. Instructors and coaches will obtain a great deal of exceedingly useful information from the context, as well as from the illustrations, just as they did from my previous book, "At Home in the Water." This is, indeed, my principal object in writing the book. At the same time, the descriptions and illustrations are so very clear that a non-swimmer, or an advanced swimmer, will be able to work from them, either to help himself, or a class of pupils, to a further knowledge of the art of swimming.

GEORGE H. CORSAN.

August, 1924.

INTRODUCTION

Mr. George H. Corsan, in my judgment, has done more than any man in America to popularize swimming. The nation owes him a tribute of grateful appreciation.

Swimming is considered one of the best, if not the best, form of physical exercise. It stimulates all the muscles of the body and yet without nervous strain or tension. It is, like few exercises, equally good for men and women of all ages.

Swimming does not develop large musculature, but tones up the muscles and fashions them in graceful curves and lines. Diving is one of the most graceful of exercises and most exhilarating. Swimming is a splendid stimulation to respiration and circulation as well as digestion. It makes for good posture. The fact that the body does not need to sustain its own weight provides for exercises of limited effort.

Swimming develops self-confidence, courage and endurance, and when carried to expertness enables the individual to rescue others from danger and from drowning. Thus it has connected with it certain traditions that add dignity, romance and adventure to the sport. Moreover, swimming is rich in psychic content. How happy and joyous people are when frolicking in the water! How they shout and yell! The whole family, the whole class, the entire school or company may swim together. It is extremely social and joy provoking.

Now swimming to many has been exceedingly complex, a hard thing to acquire, a difficult thing to learn. Fear has dismayed and danger that has seemed imminent has discouraged many.

The old breast stroke which was used almost exclusively with beginners was so difficult and required such fine co-ordination of arms and legs that many were disheartened because of slow progress. This, combined with poor instructions with reference to breathing, was sufficient to hold back very general participation until George Corsan came along. He eliminated the breast stroke for beginners. He substituted the crawl, the more natural and more simple method. He taught in shallow water, he warmed it where possible and then introduced the use of the water wings as a sub-

stitute for the pulley. These wings he placed at first under the thighs so as to keep the legs quiescent until the arm movements were well acquired.

He showed remarkable skill in teaching pupils to breathe properly and readily while swimming. Under his system people of all ages and of all physical condition learn to swim readily and well. Very few, if any, fail under his wise and careful supervision. I have seen boys by the hundred learn to swim in a few minutes. He inspires confidence and gets quick results. Swimming has been brought within the possibility of the weakest. It is now the sport of the masses.

Corsan has developed a method for teaching large numbers simultaneously. In Y.M.C.A. swimming pools, on bathing beaches and in municipal baths tens of thousands have had his ministry. Whole regiments of soldiers, the entire body of a school have been taught to swim in a marvelously short time.

What Coué is to auto-suggestion, what Edison is to electricity, what Camp is to athletics, George Corsan is to swimming.

His plan is sound, sane and scientific. His method is worthy of adoption, his counsel good for following.

I commend this book for serious study and universal acceptance.

GEORGE J. FISHER, M.D.

New York.

TABLE OF CONTENTS

		PAGE
	Publisher's Note	vii
	Foreword	ix
	Introduction by George J. Fisher, M.D.	xi
CHAPTER		
I.	Man's Structural Nature	1
II.	Fear Elimination Drill	4
III.	Description of Strokes	14
IV.	Shore Drill	38
V.	Shore Leg Drill	41
VI.	Crawl Swimming Drill	43
VII.	Diving Drill	45
VIII.	Speed Swimmers' Drill	72
IX.	Coaching for Contests	76
X.	Teaching Children	82
XI.	Why Women Should Swim	86
XII.	Life Saving Drill	92
XIII.	Stunts and Fancy Swimming	106
XIV.	Water Sports	114
XV.	Swimming Meets	124
XVI.	The Art of Teaching Swimming	133
XVII.	Therapeutic Value of Swimming	139
XVIII.	Natatoriums	148

LIST OF ILLUSTRATIONS

George H. Corsan, Sr. ..... *Frontispiece*

PAGE

All Muscle 2
Perpendicular Breathing Practice 5
Rhythmic Breathing 6
Submerging 7
Waiting for the Next Hundred 8
The Push Off and Drift 10
Motionless Sinking Stunt 11
Sculling 14
Massed Class Sculling 15
Massed Class Learning the Flutter (or Crawl) Kick 16
The Back Crawl Stroke 17
The Back Racing Stroke 18
Teaching Frog Kick 18
Demonstrating the Scissors Kick 19
The Frog Kick 19
Frog Kick on Back 20
Massed Class Learning the Scissors Kick 21
Left-Handed Scissors Kick 22
Scissors Kick 23
Back Stroke and Scissors Kick 24
Double Overarm Back Stroke with Frog Kick, seen from above 24
The Finish of the Side Underarm Stroke; also the Finish of the English, Side or Single Overarm Stroke 25
Massed Class in Crawl Stroke 25
Racing by the Crawl 26
Massed Speed Drill 27
Foot Action 28
Learning the Crawl Arm Action with Assistance 29
Land Drill 30
Land Drill for the Crawl and Trudgeon Strokes 31
The Front Crawl 31
Looking Down on the Front Crawl 32
Head-on View of the Front Crawl 32
A Head-on View of the Front Crawl Shoulder Action, Showing Hand, Elbow and Wrist Positions 33
Teaching a Child 34

PAGE

Front Crawl and Trudgeon Strokes 35
Hand Stand Dive 46
Position in the Air from a Hand Stand Dive 47
Swan Dive Taken from Hand Stand Position 48
Position on Leaving the Board for a Front Jack-Knife Dive or for a One-and-a-half Forward Somersault 49
Front Jack-Knife Dive 50
A Very High Plain Dive 50
The Neck Dive 51
The Swan Dive 52
The Arms Straight Ahead Swan Dive 53
Another Form of Swan Dive 54
Back Dive 55
The Come-Back or Isander Dive 56
Come-Back Dive from Trapeze 57
The Butterfly Dive 58
The Gainer Dive 59
The Gainer Dive from a Trapeze 60
The Back Jack-Knife Dive 61
Somersault and Dive from Trapeze 62
Forward Somersault from Back Jack-Knife Dive 63
Cannon Ball Dive 64
Forward Somersault and Dive 64
Forward Screw Dive 65
Backward Screw Dive 65
Back Forward or Half Corkscrew Dive 66
One-and-a-half Back Dive 67
Dolphin Dive 68
Airplane Dive Banking 68
Pike Forwards, Dutchman and Full Twist—Three-in-One Dive 69
Ready for the Massed Drill: Racer's Plunge 71
Racer's Turn for the Right-Handed Swimmer 73
Racer's Turn for the Right-Handed Swimmer 74
Racer's Turn for the Right-Handed Swimmer 75
Saving Life 93
To Keep from Being Seized 94
Life Drill 95
Release Method in Case of a Double-Handed Wrist Grip 96
Release from Front Grip 96
Release Method in Case of a Rear Strangle Hold 97
Release from Rear Grip Around Body and Arms 98
Towing 98
Facing the Rescued is Dangerous 99

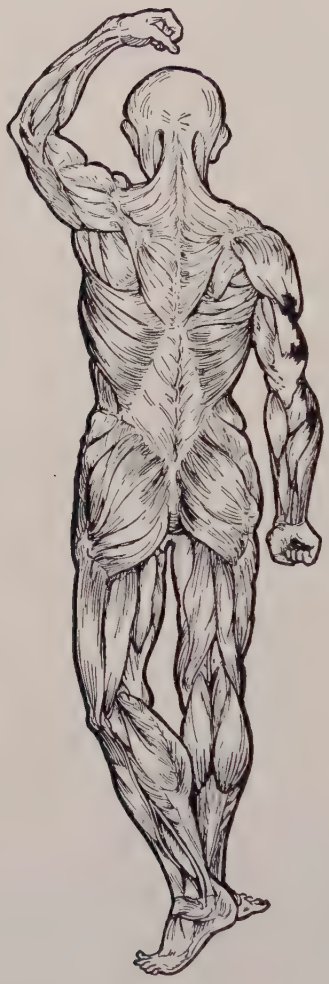
PAGE
Rescuer Towing by the Frog Kick 99
Subject Cannot Grip Rescuer 100
Rescue Work Not Effective by Side Stroke 101
Rescue Work with the Frog Kick Back Stroke 101
Rescue Work with Shepherd's Crook 102
The Shafer Method of Resuscitation 103
A Very Good Method of Resuscitating 103
Shafer Resuscitation Drill by Red Cross Pupils under Captain Mills 104
Swimming with Hands and Feet Tied, seen from above 107
The Double Somersault 108
The Propeller 108
The Torpedo 108
The Submarine 109
Imitating a Porpoise 109
The Tandem Crawl 110
Tandem Back Crawl 110
The Dolphin 111
The Wheel 112
Water Polo 119

ST. OLAF COLLEGE LIBRARY,
NORTHFIELD, MINN.
23500

I. MAN'S STRUCTURAL NATURE

From a structural standpoint man is better adapted for climbing than for either running or swimming. The Papuans can travel through swamps with remarkable rapidity, swinging from branch to branch, and white men who devote their time and energies to buying up the skins of the birds of paradise learn very quickly to travel as fast as the natives. But look at our fastest runners and match them against a short-legged dog in a race and what is man but a pitiful object! Then, again, throw any land animal into the water for the first time in its life, and it immediately sets up a running motion on the horizontal. The mouse, on its first immersion, will probably swim faster than the mouse that has had frequent immersions, as fear impels it in the new element. Its style is the same as the mouse that has had much practice; it has nothing to learn. Any land animal between a mouse and a moose will do the same. A dog, on first being thrown into the water, will often set up a jumping motion but will soon lie low and change to the dog-paddle action which it ever after assumes. While the short-legged dog can run faster than the long-legged man, yet the man will greatly outclass the dog in the water for speed and stunts—after long instruction.

Man must be instructed in the art of swimming, as, without exception, he will assume the vertical and set up a climbing action, clutching at the atmosphere in his frantic endeavors to get out of the water; and on finding his breathing interfered with by the water choking him, he immediately becomes quite insane with fright, and in a very short period will do everything that the brain of man could think out in a life time of study to drown himself. He will cry: Hi! Ho! Help! which cries throw all the air out of his lungs and cause him to sink deeper. He will lift both hands and arms high out of the water, which act always thrusts him under deeper than ever. He will twist and squirm so ridiculously hard that any air that is contained in his clothing is at once expelled. But worse still, if a rescuer goes to save him, he will do his best to drown him also.



ALL MUSCLE

I have yet to find the person who cannot be taught to swim. This is the nearest approach possible to such a condition, that I know: a person who is all muscle, who has no fat, and who has very small lung capacity. This individual has enormous muscles. He would sink like a stone. I taught a Welsh miner, who was of a build similar to the one illustrated, to swim; while he was absolutely fearless of the water, he almost used up all my patience and energy in swimming fifty yards—both of us would be exhausted, I looking on and instructing, he in learning and expending an elephant-power of energy. Very fat people, with small muscles, who float like corks, present to instructors an entirely different case and a difficulty opposite to the instance cited above.

Now, one can comprehend the structural inadaptability of man to master the water at first trial like other animals, but how can we account for the great mass of very highly educated people being so densely ignorant of the simple art of swimming? Tell a very large audience, in the present year, anything of the art of swimming, the proper method of breathing when in the water, that a woman drowns on the surface of the ocean and not by sinking deep under, etc., etc., and it is all entirely new to them. They look astonished! Then tell them that many thousands of women have drowned in water not over 3½ feet deep, in the short time that I have been alive, and they are aghast! Yes, it is very pitiful how densely ignorant the most educated of us humans are.

II. FEAR ELIMINATING DRILL

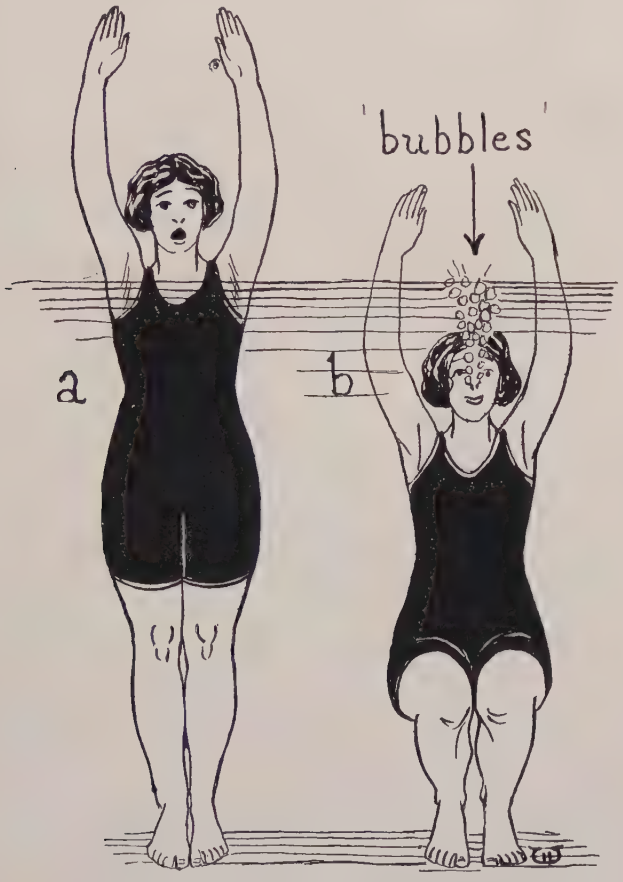
The elimination of fear is the first condition of correct swimming instruction. Fear tenses muscles that must be relaxed, and interferes with rhythmic breathing which is the foundation of correct swimming style. The instructor should take care to make the fear elimination drill his first consideration.

Before starting this drill, have the conditions right; have the water quite warm, as warm water relaxes the muscles and greatly helps to eliminate fear. Have the water shallow, not above the pupil's waist line. The water should be clean and clear, as opaque water makes the timid subject imagine there are all manner of snakes and insects in it. Explain to the class that fear is a terrible, powerful spirit that takes entire possession of reason, causing the subject to become temporarily insane. Induce the pupils not to hold the breath, or tense the muscles; as by doing either of these, they are wasting force, putting a most unnatural strain on the heart and poisoning the blood. The spirit of fear lives in a foul atmosphere, and by holding the breath fear is generated; whereas, by deep breathing fear is expelled.

1. Get the pupils to enter the water with the hands held hard and flat open with fingers straight and together, and, as soon as the hands can reach the water, to place them in the water and not try to balance by holding them up out of the water, as a strike at the atmosphere is not nearly so effective as striking a very much heavier body—the water. If the class consists of elderly women have them sit down on the edge of the pool and then, placing both hands on one side, slip into the water. This is a very much better, quicker and safer method of entering the pool than by the ladder which is slow and dangerous as one of them might break a leg or knee cap. If the drill is taking place in the open water, have pupils line up and walk out together.

2. Place hands on the bottom of lake, river, or swimming pool, in whichever place the drill is being conducted. All face the shore. Rest on hands and permit the body to assume the horizontal, and lie as low as possible in the water, permitting the body to relax.

Here the tendency will be for the more timid to get on their feet and stumble over, getting well choked and strangling with fear. This



PERPENDICULAR BREATHING PRACTICE

Breathe in air through the mouth as in *a*; bend the knees and sink, blowing out the air, as in *b*. Take one second to breathe in and about ten seconds to breathe out. Too much force expended in blowing the air out may close the nasal passage; use the exact, right amount of force, and this most important of all details—correct breathing—may be learned by a class of two hundred in a few minutes. To form the habit of correct breathing in swimming, do this exercise a score of times.

is the period for the drill master to be very, very firm and not permit them to do so. If the terrified persons would only get up on their knees instead of straightening out, it would not be so bad, but they

are determined to rise to their feet. Be firm and insist on their doing what you say.

3. After getting the class to assume the horizontal and relax while holding the hands on the bottom, have the class take a very deep breath in through the mouth by opening the mouth with a jerk, taking in an enormous amount of air with a gulp, and then closing the mouth with a snap. After holding the air for a moment or so allow it to flow out through the nose in a steady stream, keeping

RHYTHMIC BREATHING

A big class of Uncle Sam's soldiers going through the breathing drill at San Diego, California, 1918. They are taking in air through the mouth.

Rhythmic breathing is the basic principle of the art of swimming: breathing in through the mouth by a gulp, taking not more than a second of time; closing the mouth, submerging the head and blowing the air out of the lungs, under the water, through the nose.

If the water is very shallow, rhythmic breathing can be learned in the horizontal position, lying face down in the water, with the hands spread flat on the bottom.

the mouth closed and relaxing while the process is going on, and especially so while exhaling. Repeat a few times.

4. Class remains as they are with hands still on the bottom and body on the horizontal. Next, take the left hand off the bottom and place the left elbow there instead and recline slightly on left side, having the left shoulder and left ear in the water; roll the top of the head well down into the water and swing or incline the chin and face up, a head-down-face-up position. Now, have the class

breathe in through the mouth as in 3, then turn the face down by a half rotary movement of the neck and a slight roll of the body and exhale all the air through the nose in a steady stream of bubbles under the water; the exhaling may take ten times as long as the inhaling. Make the exhaling complete. The tendency here is for the pupil to raise the head and shoulders out of the water on the completion of the exhaling; this must be sternly suppressed as the chief purpose of the exhalation under water is to prevent the error of lifting the body out of the water, an error which often occurs with

SUBMERGING

The same class submerging. Note the hesitation of these big, powerful men to duck themselves. This is their first lesson and they have not overcome their fear of the water. They were not aware the picture was being taken. However, they were in the water and kept at their lessons until they could swim. I have had pupils who were really terrified of the water.

fatal results. The next move must be to roll the head down again, the mouth up, and take in through the mouth another enormous, deep breath. This to be repeated again and again. Even in such a simple matter as opening the mouth there is a best way, and this should be most carefully explained to the class. The mouth should be opened, just a little, covering the teeth with the lips, thus opening the jaws fairly wide, the throat very wide, and the lungs enormously. The tongue should be rolled back in order to act as a back-water gate, thus most effectively preventing the entrance of water into the windpipe, which would result in choking and strangulation.

Terror arises when the breath of life is in any way interfered with; this must be most carefully anticipated and avoided or prevented.

WAITING FOR THE NEXT HUNDRED

Massed swimming instruction to Uncle Sam's soldiers at San Diego Bay, California, 1918. We built the crib in the bay for two reasons: first, to keep that dreadful pest, the sting ray, out where he belonged; and in order, secondly, to provide shallow water for instruction. These powerful men came from Montana, where the water is too cold for swimming, and from Arizona, where there was no water for swimming. I had from 100 to 150 in each class.

Some people are easily discouraged and their minds border on a state of insanity when smothering takes place. One might feel like

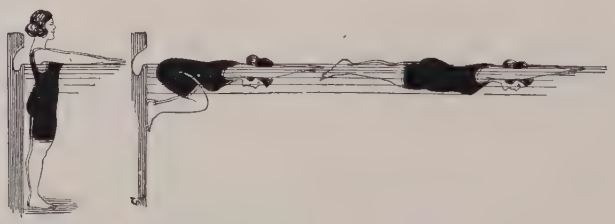
giving a pupil a good shaking, but the real instructor will be filled with an iron determination to conquer and subdue the cowardice in the pupils and turn them into companionable creatures altogether different from their past selves.

5. Have the class in water about 3½ feet deep, the water to be clear if possible. Do the "dead-man's float." This is to lie face downward, keeping the legs straight stretched and together while the arms are spread apart. The pupils should start by taking in a deep breath; in fact, this is the first thing to do in every circumstance in the water. Before lying down on the water, the women should be informed how to regain their feet, as the feet of very many float—to the great envy of men—whereas the feet of men are like anchors and drag them down. Many women have been drowned in very shallow water simply because they could not get their feet on the bottom; their balance lost, they have strangled to death in sight and help of those who did not understand the situation; many an unfortunate woman has been so drowned and the undertow blamed for it. Until a woman can stand on her feet whenever she wants to do so, a terrible sense of fear will always possess her. By striking the water a blow simultaneously with both hands held flat open in any direction whatever, and at the same time drawing the knees up to the chin, the feet may be placed on the bottom; the breath must be held while endeavouring to stand up, and the pupils should be taught to hold the mouth tight shut during the effort to regain their feet.

6. Repeat the "dead-man's float" but lie down much longer, holding the breath and keeping the eyes open, relaxing the body completely.

7. The class will place their backs to the wall at one side of the pool; then lower the shoulders to the water level while keeping close to the wall, suddenly drop the face and head between the two extended arms and simultaneously jump both feet up to the wall, back of where the shoulder blades were, and give the wall a hard shove or kick, thus driving themselves across a 20-foot space without other motion, keeping the eyes open under the water. This is called the "drift" and the object is to get the body straight, stretched, compact, narrow and horizontal, as any crooked or oblique position of the body is dangerous. The most dangerous position for a person of heavy specific gravity in deep water is the perpendicular, and the safest is the horizontal. And the more horizontal the subjects keep themselves the farther, faster, and easier they will drift

across the pool. Repeat, going back and forth across the pool many times. The instructor will observe that at first many of the pupils will push the wall with but one foot, and low down, not high up as directed, and give only a gentle shove off. By constantly explaining the right method again and again, the instructor will succeed in getting the entire class to conform to the ideal. One of the chief details to observe in this part of the drill is to have the eyes open while drifting across, as the pupils are thus able to observe the progress across the pool and divert the mind from fear. Before recovering foothold it is best to let the breath flow out of the lungs through the nose in a steady stream while the face is still under the water as, of course, the swimmers have started off with lungs full



The Push Off and Drift

of air. This feat of drifting across the pool from the shove off is known as the "coast" or "drift."

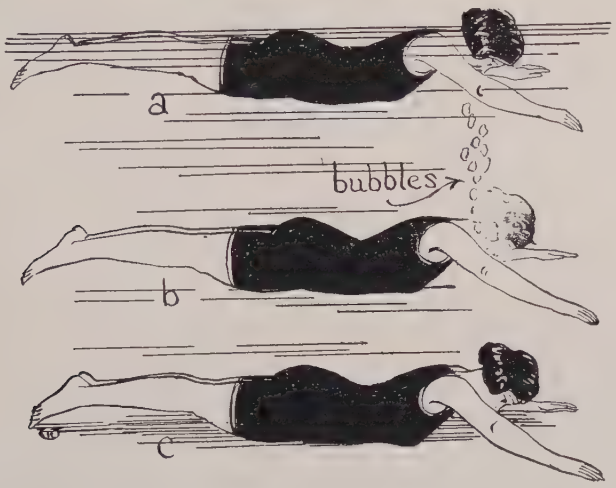
8. Have the class again assume the "dead-man's float" position and after holding the breath for a moment, commence to blow all the air out through the nose in a steady stream and try to sink to the bottom, lying flat on the bottom, face down for a moment, then, placing one or both feet on the bottom, or simply both hands, spring up to the surface. This is known as the "motionless sinking" stunt and cannot be done by women in salt water, though many women are unable to perform this feat even in fresh water.

9. If the class is too terrified of the water to run through the above drill, then put them through the "leg drill" as described elsewhere.

10. Pair off the class and have one of each pair float on the back without motion of any kind except to stand up while the other pupil stands by to see that the second recovers footing. Then have them reverse positions. This section of the Fear Eliminating Drill may be omitted in men's classes as very few men can float in fresh water without motion, and in the second place, men find little or no

difficulty in being able to get on their feet, as their feet are usually on the bottom. The woman who is standing on guard to help the other pupil should be alert to see that her charge does not fall back into the water too quickly, but very gently and gradually; also, to see that she does not duck herself on attempting to stand up by lifting her hands out of the water. Holding the hands close behind the floater's head is all the caution necessary.

11. In case the water is over two feet deep at its shallowest end, then, instead of paragraphs 3 and 4 of this drill being carried out,



MOTIONLESS SINKING STUNT

The motionless sinking stunt starts as in *a* (the dead man's float) and progresses to *c*. I have yet to see a woman able to perform this feat in salt water. In fact, not a very large proportion can even do it in fresh water for women have much difficulty in sinking at all. Nearly all women who drown do so by strangling to death on the surface.

the following perpendicular, rhythmic breathing drill will have to be substituted for the horizontal, rotary, rhythmic breathing drill described in paragraph 4. In this the pupils stand in water from three to four and a half feet deep, and after taking a huge gulp of air into the lungs through the mouth, they close the mouth, submerge, and exhale in a steady stream of air bubbles, out through the nose, under the water, holding the mouth closed. On finishing the exhaling, stand erect and take in a new breath and repeat, the feet to be kept on the bottom all the time. (See illustration.) Rhythmic breathing can actually be learned in a wash basin.

Breathing that is interrupted or interfered with, through the person not making a complete exhalation, or because the person draws water up through the nose, or by a mixture of air and water on the windpipe, causes fear. Therefore, to acquire harmony in this respect should be the chief objective of the instructor with his pupils. *Thus is fear eliminated because the most important detail of the art of swimming is mastered and full confidence acquired.*

12. Floating is a feat for women principally, but the average man can float motionless in salt water; some men can float motionless in fresh water. But many more than now do, could float motionless in fresh water if they would use this method: they should get into water so deep that they can just touch their toes on the bottom, next stretch the neck and throw the head back, tilting the mouth up so that it just reaches the surface, then take in a deep breath of air and raise the feet from the bottom. If floating is accomplished, exhale with a gust, yet retaining some air in the lungs; then inhale to the greatest possible extent and hold for a while before exhaling as before. After this has been repeated so that the method has been thoroughly acquired, it may be tried in deeper water. In floating, every part of the body is submerged except the mouth.

Water Wings

I never use water wings in my fear eliminating drills. I use them to enable the pupil to acquire correct style, to enable him to devote the mind to detail and to acquire the arm action or leg action perfectly; also to acquire the proper co-ordination or rhythm. The water wings hold him up and enable him to develop correct style far more rapidly than if he had to make false downward pressure for support. For nearly all strokes wherein the swimmer is going head first, the pressure should be entirely rearwards and never downwards. Thus, to let the beginner make downward pressure is to waste valuable time, as later on he must entirely eliminate these movements. Therefore, why not start small children on the crawl stroke at once instead of the dog-paddle? The water wings enable the instructor to do this very thing. Also, water wings enable the teacher to get his clumsy pupil out of faults. Faults clung to and persisted in, will be so acquired that the swimmer may drown himself some day just because of a fault.

I have examined a great many other swimming devices, and

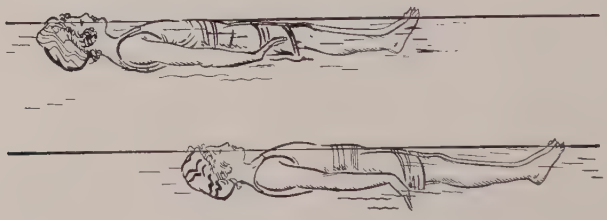
they are so absurd as to be hardly worth mentioning. The simplicity and cheapness of the water wings appeal to me. When one considers the crazy old method of a pole, rope and belt and the trolley system, which I discarded in the year 1900 for the water wings, which enabled me to teach one hundred at a time, instead of one, and teach the hundred better, it can be very clearly understood why I like water wings.

III. DESCRIPTION OF STROKES

The naming and describing of strokes outside of the purely ornamental and fancy swimming feats will be the order of this chapter, beginning with basic strokes and advancing to the finished styles.

Strokes on the Back

1. *Sculling,* head first: Lie perfectly flat on the back, chin and hips up, and propel head first by the shoulder and arm muscle ac-



Sculling

Head First.—The upper cut illustrates the position of the hands for sculling head first. The tips of the fingers must always point up. The water must be shoved rearwards on both the outward and inward movements; there is no recovery. The movements are made by the shoulder and forearm muscles. There must be no movement of the fingers, hands or wrists whatever. The hand must be held rigid and hard as a board all the time. Work the hands with a twist and a push at the same time. The movement of the hands should not go out from the hips more than a foot. On the outblow, the elbows should extend out from the ribs about two feet. The movements are short, rapid, snappy; and in and out together.

Feet First.—The lower cut illustrates the position of the hands for sculling feet first. The tips of the fingers must always point down. Work the hands by a rapid motion underneath the hips.

Sculling may be acquired in one lesson by ninety-nine people out of every hundred. It is a very neglected detail of the art of swimming and many so called swimmers have never learned to scull properly at all. Sculling is of tremendous value in case of emergency, such as cramps.

tions only, while keeping the wrists set and immovable, driving the water rearwards by both the outward and inward strikes of the

hands which are held hard-flat-open, holding the heels of the hands down and the tips of the fingers up. The movement of the hands should not go out farther from the hips than a foot, though the elbows should extend out from the ribs, on the out-blow, two feet. The movements are made with very great rapidity, not alternate but out and in together, and decidedly snappy and short. (See illustrations.)

MASSED CLASS SCULLING

Sculling is swimming on the back by using the arms only. This class is going head first. To do the "steamboat" add the flutter or crawl kick to sculling.

Sculling is of tremendous value in saving one's life when the legs are cramped, and in many other contingencies.

2. *Steamboat-on-back:* Add the flutter kick to sculling. In this, both the leg actions and arm actions are short and snappy, yet there is absolutely no co-ordination between the two, and hence a little trouble for the beginner to acquire at first.

3. *Back Crawl Stroke:* This stroke is generally known as the racing-stroke-on-back; and with the front crawl is the fastest sprinting stroke there is. It is an alternate overarm stroke, using the

flutter kick. It is an easy stroke for women and those of light specific gravity to learn. (See illustrations.)

4. *Alternate Overarm,* with frog kick: This stroke must be worked with proper co-ordination; it is an exceedingly easy stroke for a man to use who is caught in the water with all his clothes on.

MASSED CLASS LEARNING THE FLUTTER (OR CRAWL) KICK

In this particular instance, the pupils are holding their hands firmly on the bottom. Their entire attention is centred on the crawl leg action on back. It is easier to learn the crawl kick on the back than on the front. The feet must be kept in the water. The legs are worked up and down by a violent flutter. The knees are almost stiff. The action, on the back, is whip like, or like a fish tail snap; it is very rapid, continuous and alternate, and very short and snappy so that the water will "boil" at the feet. Don't hold the breath while doing this. Keep the feet in the water. Add this kick to sculling for the "steamboat."

The kick must be delivered with the pull of each arm, the breath is driven out through the nose as the kick is delivered, and inhaled on the drift and as the arm rises. There should always be a distinct stop at the finish of each stroke. First, one arm pulls or drives the water rearward and then the other, so that three limbs work together in propulsion. One arm must not rise as the other pulls, as

in the back crawl, but must stop at the side and rise gently on the drift and recovery of the legs. The arms must not be jerked violently out of the water, or the swimmer will throw a lot of water

THE BACK CRAWL STROKE

Beginning at 1, this series of photographs shows the progress of the arm and wrist movements in the back crawl stroke. The scooping action of the hands, which are held flat open, continually drives the water rearward. First one hand grips the water far back of the shoulder and, by the action of the shoulder muscles, presses the water towards the feet, thus sending the swimmer head first just as a canoeist sends his canoe along when he uses a double-bladed paddle. In these photographs the legs of the swimmer have been held still, which is a feat that only a woman can do; a man cannot do it unless he is built like a woman; the kick was not used with the arm action because it would have disturbed the water so that the arm action could not be so clearly noted. The back crawl stroke is much easier than the front crawl to learn; but the same muscles are used for both strokes. Note that the arm at 2 and 4 is straight on entering the water. Splendid practice for the *crawl* on back is to swim up and down the pool as close to the edge as possible in order to attain that shoulder heave-up and dip-down.

in his face. The stroke should be performed without throwing a drop of water on the face.

5. *Alternate Overarm,* with scissors kick: In this stroke on back there are the same restful actions as in the preceding stroke. The spine is so turned during or at the finish of the drift as to swing one leg under, and that leg is drawn back and makes the most im-

portant drive. Thus the swimmer will pace on the back, working the right arm pull with the kick of the right leg; and then work

THE BACK RACING STROKE

An alternate over-arm stroke on back, accompanied by the flutter kick. The arms must not be jerked out of the water. By a spinal motion rotate one shoulder up so that the shoulder touches the chin (the chin must not move from right to left but be held up), then swing the arm across the body so that the elbow passes directly over the face. Reach the hand in the water far back of the shoulder, not behind the head. This stroke is also known as the back crawl stroke. Women may learn this stroke in a week, sometimes even in a day, but the average strong man finds it hard to learn.

the other half of the body, pulling the water with the left arm and kicking the water on the other side of the body with the left leg;

TEACHING FROG KICK — Sure, [illegible]

To teach the frog kick to a stiff-jointed, clumsy person, catch hold of each foot and work their legs a few times. In this way the pupil gets the action much more quickly.

thus the swimmer would resemble two men in a canoe, each using a single-bladed paddle, the one in front using his paddle on one

1 2 3

DEMONSTRATING THE SCISSORS KICK

In 1 and 2, demonstrating the left-handed scissors kick to a class out in the shallow water. A box is used so that the class can see every detail.

In 3, demonstrating the right-handed scissors kick, the right hand being uppermost.

In the scissors kick, the under foot should be drawn back gently as far as possible (Position 1), then kicked forward, with all the force possible (Position 2), where there should be a distinct stop.

1 2

3 4 5

THE FROG KICK

The frog kick should be done on the back only; never on the side or front. Draw the legs from position 1 to position 2, very quietly; then from position 3 to 5 as one movement and with a snap. At position 5 make a distinct stop. The stroke may be learned in water from one foot to eighteen inches deep, by almost anyone, in one lesson. The class faces the instructor who is demonstrating on shore. Note particularly the ankle positions: where set square, where pointed, or at extension, as the water must be struck backwards with the soles of the feet, not struck with the top. In position 4 the ankles are moved to point the toes, and the position is held in 5.

side and the one in the rear using his paddle on the other side of the canoe. The swimmer would differ from the two men in the canoe by the fact that he would change each time, whereas the canoeists

Frog Kick on Back

Looking down on the frog kick on back. The pupil holds the scum trough while her head is in the corner. Directions:—Draw the legs from *d* to *a* very gently, with the toes pointed, then set the ankles, as in *a*, so as to strike the water rearwards, with the soles of the feet (never with the tops of the feet as the under leg does in the scissors kick). Notice the movement of the ankle, *b* to *c*, that is, from set to point positions. This is very important. Note particularly the time from *a* to *b* and *c* to *d*, which is one movement, as, at *d*, there is a very distinct pause. In towing a non-swimmer, the pause must not be so prolonged as in ordinary swimming, but the length of the pause will depend upon the swimmer: a man of heavy specific gravity cannot pause and drift as far as a woman of great buoyancy can. Breathe "out" on the kick and "in" on the drift.

would keep steady, each on his own side. This stroke is beautifully adapted for long, rangy, supple persons; and while it seems like a very complex stroke, yet it is simple and not at all hard to learn. It is a stroke that one can keep up for a day without becoming ex-

hausted, as it is a lazy, powerful stroke. I originated and introduced this stroke in the year 1901.

6. The *Half-Paralyzed Stroke:* This is to swim with the left leg and left arm only, or with the right leg and right arm only. It would be half pacing. In this stroke the scissors kick is used and the one arm is swung out of the water while on the back; then by a half roll,

MASSED CLASS LEARNING THE SCISSORS KICK

The right-handed scissors kick. The instructor can teach the scissors kick indoors by having the pupils cling to the wall of the pool, keeping the lower hand flat against the wall, fingers down, about a yard below, and directly beneath the upper hand which should secure a grip on the scum trough or upper edge of the wall of the pool, thus keeping the feet directly outwards. The lower hand will regulate the position of the feet and hold them up. Outdoors the matter is very much more simple as the pupils can lie in the shallow water.

on to the same side as the arm in action, the leg and arm strike the water rearwards together; only the left leg strikes the water on the right side of the body, while the left arm strikes the water on the left side of the body. This stroke is exactly one-half of the preceding stroke. The other leg and arm remain perfectly still. It is a good stroke for persons whose entire one side is paralyzed, and

for this purpose I invented this stroke in the year 1905 for a man who could not use his right side in any way.

7. *Single Overarm:* This is a twisting back to side stroke in which both arms are used on the same side in the stroke, but only the under arm is swung out of the water. The scissors kick is used,

Left-handed Scissors Kick

The ankle of the upper foot must always be held at extension so that the toes are pointed. It must never be moved from that position. The upper leg just limps the knee very slightly forward and snaps up to meet the powerful strike of the forward drive of the under leg. The top of the under foot should make a wave at the strike. The lower leg must not pass beyond the upper. In learning the scissors kick in such shallow water, it is impossible for the swimmer to separate his legs from below upward; he must separate them from before backward.

and is made when the body lies on the same side as the arm that is swung out of the water; both arms shove the water rearwards at the same time the kick is made.

8. *Double Alternating Overarm,* with the scissors kick: Same as the above only alternating from back position to side and then from back position to the other side; thus one stroke uses left

handed scissors kick, and the next stroke the right handed scissors kick.

9. *Broad Stroke:* Lying flat on the back, having arms at sides and hands close to the thighs, draw the legs apart in preparation for the frog kick, and at the same time draw the hands out to the

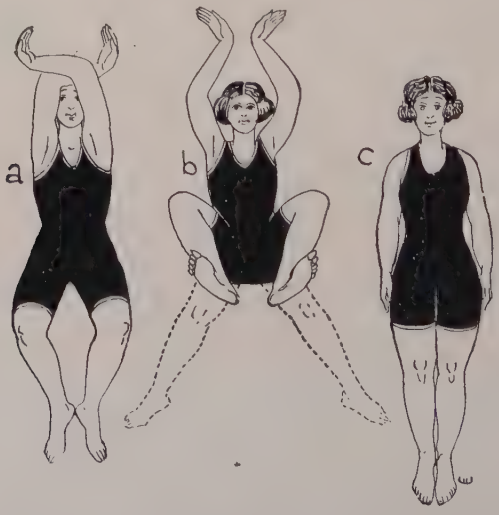
Scissors Kick

Holding on to scum trough, as seen from above.

position of a Latin cross, bringing them against the water with a sharp edge, the little fingers slightly elevated and just along the surface of the water as an oar feathering for the stroke; then, turn the hands thumbs up, and little fingers down and shove the water rearwards with as much force as possible, at the same time doing the frog kick, and then stop and drift from the force of the stroke.

BACK STROKE AND SCISSORS KICK

Back stroke with alternate overarm action and scissors kick. This is pacing on the back. It is a beautiful stroke when done by a long, rangy person. The upper arm swings most gracefully over the water as the hand on the hip swings to the position in the water in an equally graceful sweep.



DOUBLE OVERARM BACK STROKE, WITH FROG KICK, SEEN FROM ABOVE

The Finish of the Side Underarm Stroke; also the Finish of the English, Side or Single Overarm Stroke.
Always Use a Scissors Kick with the Side Stroke.

Massed Class in Crawl Stroke

Massed class ready to work on the leg drive for the crawl stroke by devoting their entire attention to that one detail. The water wings are placed at the waist and another pair is held by both hands far out in front. The action is really not a kick at all but a violent flutter, short, snappy, alternate, shallow, narrow, and continuous. The drive is upwards. This is a splendid exercise for strengthening the lower abdominal muscles in men, women and children.

Thus the arms go apart together with the legs, and both arms and legs strike together at the same time. The back must not be bent in the slightest; to lie flat is the main detail of all back strokes. This stroke may be taught on a parlour or gym floor. I have taught it hundreds of times to timid, clumsy men in one lesson, by the aid of water wings, and at the end of the lesson discarded the water wings, and had the pupil swimming fairly well.

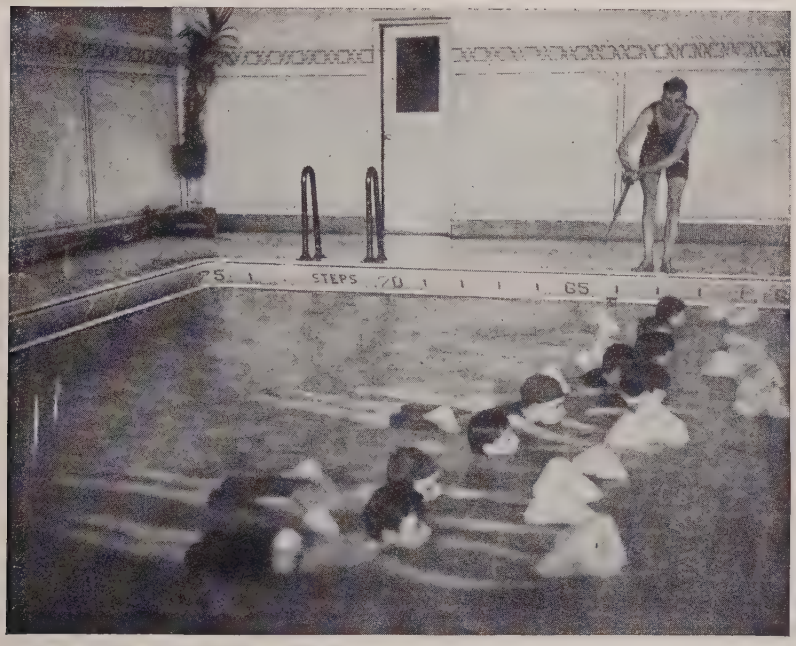
RACING BY THE CRAWL

A large class racing by the crawl leg action only. They are driving themselves through the water with considerable speed. This is fine exercise for fat people and for people who have weak lungs. It wears off the dangerous internal fat and enlarges the lower lungs enormously.

10. *Double Overarm:* This stroke may be done in two ways: (1) by the hooked wrist position and pulling with the kick; or (2) by the old breast stroke upside-down method. The hooked wrist position is the old back racing stroke lately superseded by the back crawl; and is still a very fast and easy method of swimming on the back. I will say here, there is no such stroke as a double overarm on front, as all front strokes are alternate; the side strokes single; the

back strokes may be single, alternate or double. Let us be sure that we get our nomenclature right, and do not make confusing mistakes.

The double overarm may be performed with the flutter kick, as well as with the frog kick; but in that case, only by those of light specific gravity.



MASSED SPEED DRILL

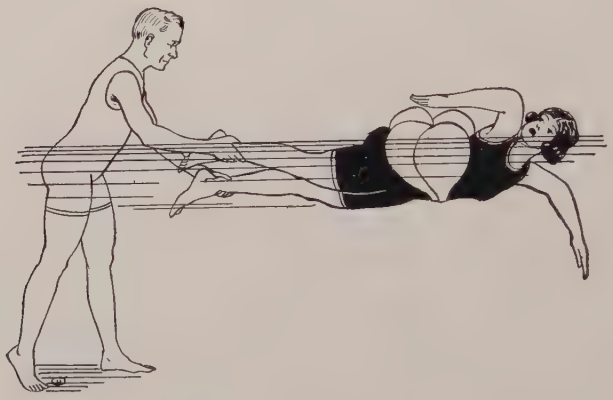
Massed Speed Drill in the pool at the Central Y. M. C. A., Brooklyn, N. Y., illustrating my method of developing extraordinary power in the leg drive for the crawl stroke. Cavill, who introduced the Australian crawl stroke, asserts that the leg drive is secondary to the shoulder action; but I consider the leg drive is very important, and not at all secondary.

Place a pair of water wings at the waist line and, at the same time, hold another pair in the hands, with the arms extended in front, thus moving forward with no assistance whatever from the arms, which are motionless. These boys went up and down the pool many times to perfect their speed.

STROKES ON THE SIDE

1. The *Side Underarm:* Performed with the scissors kick, the kick taking place as the underarm is thrust far forward and the

upper arm is shoved back; the underarm performing a lone pull as the legs recover for the next kick, and the upper arm feathers forward in its recovery for the next drive. There is a distinct stop at the finish of the kick, and the swimmer drifts forward on the side for a considerable distance, as a result of the powerful scissors kick. The upper hand should not be thrust out wide as in the broad



Foot Action

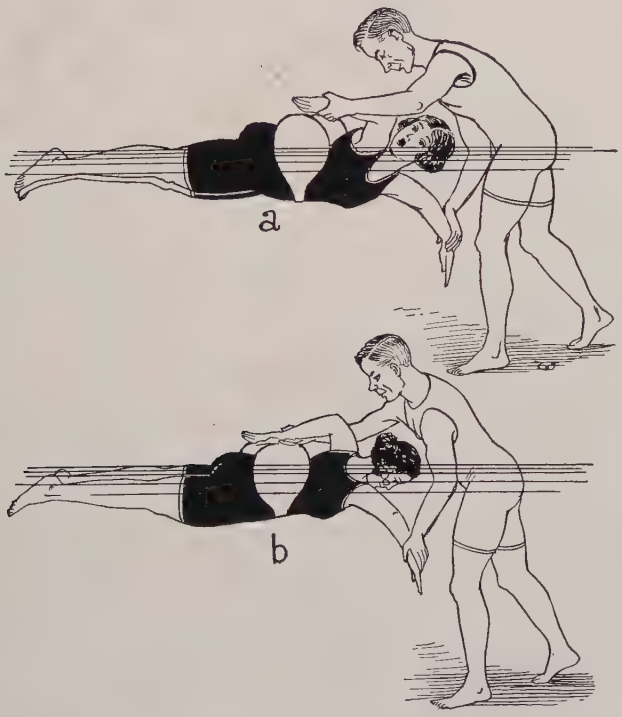
Learning the crawl foot action with assistance.

How to handle a person in the water who is terrified. The instructor, by grasping the ankles very firmly, assures the pupil from rolling over. But what is more important: by pressing down on the feet, the instructor raises the head of the pupil above normal so as to bring the mouth so far above water level that the pupil feels a thrill of relief. Even then some pupils will turn and twist and try to grasp the instructor. In such cases, the instructor should start them on the crawl arm work. Should this not suffice, put the pupils in water not over eighteen inches deep, on water wings, where the pupils can place their hands on the bottom. Some amateur instructors unwittingly duck their pupils by placing them face down in the water, and putting their hands under the central part of body to raise them up, thus shoving the face under and causing severe choking. An instructor can never be too careful in starting a beginner.

stroke but kept in close to the body both on the recovery and on the thrust back, when the hand should strike the upper thigh and held there for a moment. The lower hand should take a long, deep sweep and come far under and back.

2. The *Side Overarm:* This stroke is also known as the "English" overarm, but as we have dropped the word "Australian"

from the crawl, we will also drop the word "English" from this stroke in order to give the correct and uniform nomenclature to the art of swimming. This stroke is a repetition of the preceding, except that the upper arm does not feather the hand over the water but the entire arm swings over the water as in a half trudgeon stroke. The kick is the reverse of the trudgeon as it is delivered with the push of the underarm. This is a much more difficult stroke



Learning the Crawl Arm Action with Assistance

to master than the side underarm, though it differs but very slightly. In this stroke the entire body disappears entirely out of sight with those of heavy specific gravity. As the kick is given, at the finish of which the body rises, the upper arm is swung over the water; the breath is taken in on the drift, and exhaling is done with the kick; in fact, this is the rule with all strokes except the trudgeon. To learn the side underarm and the side overarm before learning the trudgeon

23500
794

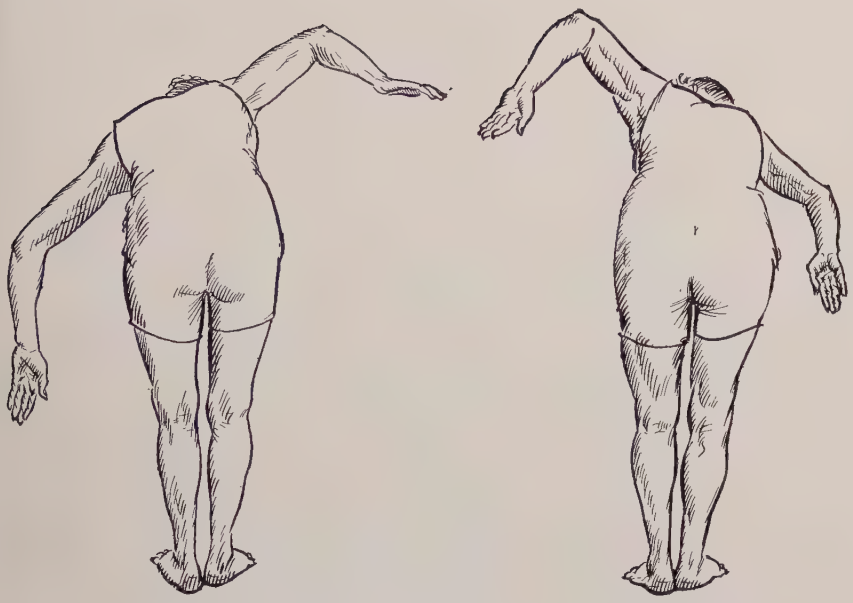
stroke causes confusion, as the co-ordination in them is the exact opposite of the trudgeon. For long rangy people of heavy specific gravity, these two strokes are adaptable, but not for stiff-jointed, thick-set, chunky persons.

The assertion that we should swim with our left side up for our

LAND DRILL

Land Drill for the crawl and trudgeon arm and shoulder action before entering the water. This drill can be taught in gymnasiums and playgrounds and should be taught in every school and to children as it is the most difficult stroke to teach in the whole art of swimming. It should be well and thoroughly learned in a land drill. I find that some of my pupils, after they have lost all fear of the water and have learned to breathe correctly, after they have acquired the scissors and flutter kicks perfectly, even when the co-ordination is acquired, are still clumsy in the arm and shoulder drive.

heart's sake has so little foundation in fact that it is not worth considering; while, on the other hand, millions of pupils are made left handed while swimming who are right handed otherwise. One should keep the skilful arm uppermost, the lower hand should make a sharp approach against the water at the forward drive.

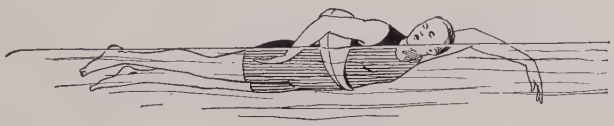


1. Wrong Position. 2. Right Position.

LAND DRILL FOR THE CRAWL AND TRUDGEON STROKES

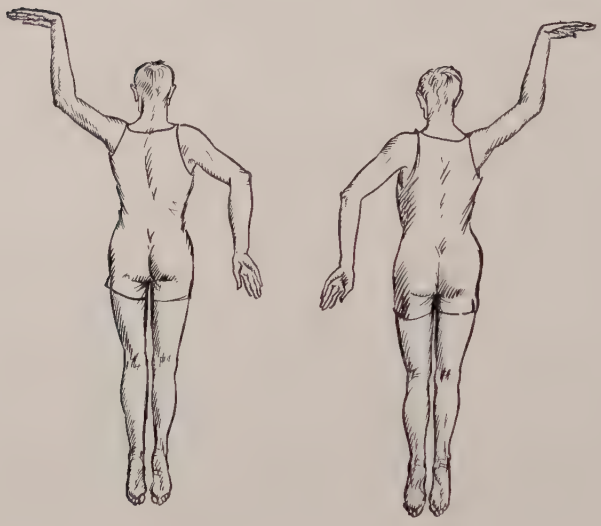
1. This cut illustrates the wrong position of the hand of the upper arm.
2. This cut illustrates the correct position of the hand of the upper arm.

The drive should be rearward and not forward, thus accelerating the movements of the lower arms. The elbows should be held out well from the ribs, especially at the finish of the drive of the lower arms. The thumbs should be turned to the rear at the finish of the drive by the forearm movement known as pronation, carefully avoiding the motion known as supination. The arms should swing forward alternately. The spine should rotate with the rise and fall of the shoulders. The top of the head should turn down with the lower arm, and the mouth, nose and eyes should turn up with the upper arm. The palm of the hand should always face rearward; the back of the hand should face the water on the recovery.



THE FRONT CRAWL

The pupil is enabled to acquire the correct form in this most difficult stroke much more quickly by the use of water wings, devoting his entire attention to arm action and breathing while permitting the legs to drag. One can teach pupils to perform every stunt in the art of trick, fancy and ornamental swimming in less time than it takes to get perfection in the crawl arm action. One hundred pupils can be taught in a pool at once, all going in a circle in one direction, as easily as one can be taught.



Looking Down on the Front Crawl

Note the hooked wrists. The fingers are turned a trifle more outward than is normal, in order to illustrate the hooked wrist position. The fingers should be turned slightly more downward so that the tips of the fingers enter the water first, instead of the thumbs as above. But I wanted to draw particular attention to the hooked wrist position. The wrists, on leaving the water, are at reverse hook, and assume the strongly hooked position on the swing over the water, to be held for the first third of the pull.

Head on View of the Front Crawl

The swimmer's right arm might be out a little farther. The left hand is higher than normal to show that the palm must face upward and that the back of the hand must face the surface of the water on the recovery.

Strokes on the Front

1. The *Crawl Stroke:* An alternate overarm with the flutter kick, having no co-ordination between the arm and leg actions. The arm action and the breathing should always co-ordinate. All long-armed persons should take breath with each stroke, also short-armed

A Head on View of the Front Crawl Shoulder Action, Showing Hand, Elbow and Wrist Positions.

However, the left elbow should be more curved, throwing the position of the hand a little more under the swimmer, thus giving more leverage power. The crawl arm work should be a terrific pull in the first half, and a terrific shove in the last half.

persons who have small lungs; but for short-armed persons with large lungs, then every second stroke would be normal. Swimmers with medium long arms should breathe every stroke-and-a-half; thus first on one side and then on the other side. But the only fixed positive rule about this is not to hold the breath but breathe deeply and enormously and in rhythm with the arm motions.

The leg actions may vary greatly as to their speed; the wiggle may be so violent as to be a ten count beat, or so slow as to be a four count beat; but the average of a six count beat is, in the opinion of most, the best time action. Beyond doubt, a ten count beat and a very slow arm movement looks best, but only those of very light

TEACHING A CHILD

Get the child to understand clearly that the crawl action is a shoulder swing wherein the elbow advances over the water ahead of the hand and that the palm must face up and the back of the hand just skim over the top of the water.

specific gravity can work this time. Specific gravity has on the whole much to do with this stroke, and the idea of calling one crawl the "Australian" and another the "American" is too absurd to be thought of for a moment, as it is the build and specific gravity that decides what count leg action there shall be.

A swimmer who is very powerful in the upper thigh muscles and weak in the shoulder muscles would put on much leg action, and the person of weak legs and powerful shoulders would use powerful shoulder action; in this case the swimmer might almost drag his legs along without action except sufficient to keep the legs

FRONT CRAWL AND TRUDGEON STROKES

A class of women demonstrating the arm and shoulder action of the crawl and trudgeon strokes. Women acquire the action beautifully, being very graceful while men are more muscle bound and are stiffer.

Many people are under the impression that because a woman cannot throw a baseball as well as a man, she has not got the shoulder action as perfectly as a man. I fought out this point with swimming instructors in 1900 and proved that the chief driving muscles in the crawl stroke are the latissimus dorsi muscles, and not the pectoral muscles.

up But in my opinion the leg drive can be made of very great importance, as you can see elsewhere in this book. The most beautiful style of the crawl is that time-harmony where the arms just creep over the water accompanied by a terrific leg drive that makes the water fairly boil at the feet.

The crawl stroke was introduced to the world at the beginning

of this century, by Cavill of Australia, who attached the Polynesian Indian's flutter leg action to the trudgeon stroke in place of the scissors kick, and made better time than he ever did before; and even beat men when he had his legs tied together. The faulty leg action of most swimmers in the last century mitigated against speed swimming, as we knew the trudgeon stroke then. I predict that very soon some man will swim 100 yards in 50 seconds, and within 35 years some woman will do the same time with the crawl stroke. The crawl is the sprinter's stroke.

2. The *Trudgeon Stroke:* This stroke was introduced to the world by a South American Englishman, named Trudgeon. It is an alternate overarm with the scissors kick given with the pull of the underarm, that is: supposing that one swims on the side stroke, one kicks with the push of the underarm; whereas, in the trudgeon one must do the reverse. Also, in this stroke one must breathe in as the kick is delivered, a rule the reverse of all other strokes. The kick must only be given once; the so-called double trudgeon given by rolling on each side and kicking twice is not a legitimate stroke at all, and is entirely out of place. The trudgeon was perfected by the North of England and Scotch swimming clubs at the end of the last century. The trudgeon is the long distance racing stroke and its special feature is the "Lancaster" kick, which means putting the accent on the under leg and carefully avoiding throwing the upper foot far forward in the scissors kick. A good trudgeon stroke is the most valuable all round stroke there is.

3. *Trudgeon-Crawl Stroke:* In this stroke following the scissors kick, instead of the legs stopping and permitting of a restful drift, two short flutters are given. It is the middle distance stroke and, of course, is not as strenuous as the straight crawl, nor as restful as the straight trudgeon. It is a splendid stroke and very popular with certain builds of swimmers.

Spiral Strokes

1. The *Rolling Crawl:* This is a very beautiful stroke when the swimmer rolls slowly while moving the legs with tremendous rapidity. It is also splendid practice for developing leg driving power and making the swimmer keep straight. It is harder than the back crawl but easier than the front crawl. The swimmer should keep the eyes open and breathe out when on the front, and in when

on the back. The arms should travel in a straight line directly over the body, and in a straight line directly under the body.

2. The *Revolving Trudgeon:* This is not as beautiful as the rolling crawl, as, when the scissors kick is used, considerable of the beauty of the movements is destroyed. But as the rolling crawl is hard for one of very heavy specific gravity this stroke may be used instead.

3. The *Waltzing Crawl:* To do this, do three rolling crawls one way, then stop and do three rolling crawls in the other direction, and then reverse again and again for the distance of at least 75 feet. It is very much harder than the straight rolling crawl, but when slowly and well done, is a most beautiful performance.

IV. SHORE DRILL

The shore drill differs considerably from drills in pools as the depth of water at the shore is very much shallower than it is in all pools. If the water is cold and the pupils cannot stay in long on that account, the instructor should keep them on the more active movements of the drill. The extra timid make much more progress in the shore drill than in swimming pools as they can do many feats in water only one foot deep; on the back strokes especially they can make instant progress. Let us imagine that one or two hundred short, thickset men or women with large protruding fronts enter the class and that, although they have been trying to learn to swim for many years, they had acquired only a terrible fear of the water under their former swimming instructors. I have met, not hundreds of such, but even thousands of them; not a few of whom had been under "confidence" experts. Now with such students don't start the drill by these "confidence" men's methods as they will not work. This idea of having the students stick their faces down in the water and open their eyes and hold their breath and play a lot of games, is rubbish; although I say this with most sincere apologies to the good intentions of such instructors, as I know all these men personally and I like them well. No. Start such beginners on the back, doing the flutter kick and holding their hands on the ground, or even digging them into the sand as this anchorage will further allay their nervousness. Let them expend all their energies on the flutter kick until they are completely exhausted. (See page 16.) When completely exhausted they will relax and lie down flat in the water; this is the very thing to aim for, as panic will leave them and common sense return, then you can talk to them about details.

After the flutter kick on the back, still holding hands on the bottom, turn over on the front, and do the flutter kick on front.

I would advise arranging the shore drill as follows, though there is nothing arbitrary about the order. In fact, I very often change my order of drills of all kinds to meet circumstances that may arise and I will say here that the order of all my drills is not

fixed, but what is most positively fixed is that nothing must be omitted:

1. Flutter kick on back. Keep advising pupils not to hold their breath but to breathe steadily and to relax the back and neck muscles. Keep this up until they are completely exhausted. (See page 16.)

2. Flutter kick on front. After the action of the entire class has been pronounced correct, have them walk along on their hands, turning their faces away from in-shorewards and keeping an equal distance from the shore so as to be in about an even depth of water of from two to two and a half feet of depth; in this position each individual can tell if there is driving-ahead power in the action.

3. Next, get the class to line up head-in in water from about eighteen inches to two feet in depth and practise the *rotary rhythmic* breathing drill. (See illustrations and other descriptions in the chapter on fear elimination.)

4. Get the class to lie flat on the water and take their hands off the bottom and open their eyes under the water while holding their breath.

5. Get class out to their full arm's depth and have them walk in on their hands, dragging their legs and practise the *rotary rhythmic* breathing feat, holding their eyes open all the time; the bubbles in this case would go to the rear of their eyes and not disconcert them as would happen when they stop in one place.

6. Walk out a little way and quietly lie flat down and scull in—legs still.

7. Steamboat in, that is, repeat 6 and add the flutter kick.

8. The class, lying on backs in very shallow water so that the entire back may rest on bottom and the chest and face are out of the water, practises the alternate overarm back crawl arm action, being very careful to get the exact wrist movements.

9. Put water wings on and repeat 8 in deeper water.

10. Keep the water wings on and add the flutter kick to 9 and do the full back crawl.

11. Class moves out to water a yard deep and stands up and goes through the front crawl land arm drill. (See page 35.)

12. Class, all going in one direction in a circle, each pupil using one or two pairs of water wings, does the front crawl arm action.

13. Repeat 12 and add the submerged *rotary rhythmic* breathing detail.

14. Each one in the class takes two pairs of water wings and

places one pair at the waist line, and holds one pair at full extension, at arm's length in front, the wings not to be pressed down in front; then work the "steamboat" on front. (See page 25.)

15. Do the entire full front crawl with one pair of water wings, aiming for style of action entirely, and not for speed.

(Note: The next three movements are for men only.)

16. Class lies on back in very shallow water and practises the broad-stroke-on-back arm action.

17. Get in water a little deeper and practise the frog kick on back. (See page 19.)

18. Stay in very shallow water and work arms and legs together.

The above shore drill practised for one hour each day for from one week to one month, will turn the dullest persons ever created into, not just "one-style swimmers," but really versatile swimmers.

V. SHORE LEG DRILL

Have the class not over 100, as the voice cannot very well reach more, and a greater number would be too far away from the leader to see the motions very clearly. The object of this drill is to loosen up stiff-jointed men as well as to impart a thorough knowledge of all the leg actions normal in swimming. The instructor should procure a soap box, as shown in the illustrations, so that he may be sufficiently elevated to be in full view of every member of the class, especially those in furthest away.

1. Class on back, with hands on the sand or gravel bottom holding firmly one position so as not to be driven in too close to the shore by the force of the movements. Perform the flutter kick. The instructor should walk down the row of pupils and correct those who are making a back and forward movement instead of the snappy downward stamping thrash of the crawl kick; correct those also who are moving their ankles or going too wide, too deep, or too high. (See illustrations.)

2. With as little delay as possible, have the class turn over and perform the flutter kick on front. The instructor should see that those pupils who are misinterpreting his directions and making a stiff, trembling action, are corrected; and he should caution the class not to hold the breath, but to breathe very deeply and freely.

3. The class turns on the left side and performs the right-handed scissors kick while closely observing the details of the kick being performed by the instructor in his elevated position on shore. The instructor passes down the row making suggestions to those individuals making errors in their movements, and he should grasp the ankles of those extra clumsy pupils and make the kick movement for them. Do not permit the class to stop until the correct time and motions are well acquired, as this scissors kick is one of the fundamentals of the art of swimming. (See illustrations.)

4. The class turns right side down and performs the left-handed scissors kick. The instructor will thus have his pupils ambifemoral, that is, to swim on both sides with equal facility. Watch closely

that no pupil throws the upper foot forward, or bends the upper ankle from extension; these very common faults must be carefully eliminated.

5. Teach the frog kick on back. (See illustrations.)

6. Go through the entire drill several times. The timid pupils will then completely relax and lie down in the water for a rest. The stiff-muscled, rusty-jointed pupils will be terribly sore the next day, which indicates positively that they are out of condition and need the exercise badly. Their muscles will soon develop flexibility and suppleness if they will stop much bread and salt eating and substitute more fruit and nuts. Size is not the most important factor in muscle training; endurance is better.

VI. CRAWL SWIMMING DRILL

The crawl swimming drill I have used for many years in my swimming campaigns for boys and girls when as many as one thousand children have been given half-hour lessons daily for a week. Occasionally I employ the drill with adult classes but only after other drills have been gone over thoroughly. The drill may be used in the open water or in swimming pools. The water should be from 18 inches to 3½ feet in depth, according to the size of the children. The instructor may stand on the bank where he can oversee every move of his class, or he may get into the centre of his class. The pupils must all swim in a circle, large or small according to the size of the pool, all keeping to the right, in order not to interfere with one another. Thus, in a space of 20 feet by 20 feet, I have often taught 40 small children at one time; and one hundred, in a seventy-five foot pool. This mass system, which I developed, creates a very strong current going in the direction of the class and very greatly assists the beginner. The water in the pool should be warm, clean and clear; by warm I mean from 80° F. to 85° F. and not under, as warm water relaxes, and relaxation is one of the principles of the art of swimming. The children should be well inspected before entering the class to see that they have washed themselves thoroughly under the showers and have washed the soap off. I mention this because many children do not know enough to rub well while under the showers, and often forget to wash their hair, neck, under their arms, toes, heels, etc. You can inspect a hundred children in two minutes: simply look at the back part of the foot above the heel and, if it is clean, then the whole child is clean. A long fishing rod in the hand of the instructor will very greatly aid in keeping order in the class. Command silence in the class; but notwithstanding this order, the children will constantly stand up and talk and waste time. The talking is mostly done by those who are afraid of the water and who wish to divert the attention of the instructor and of those who are apparently not frightened, from the fact that they are water-cowards. By poking the culprits who talk, with the fishing rod, and making them get into action, the class can be kept going

continuously for the half hour period. It is best to have the atmosphere cooler than the water. This may be accomplished by good ventilation; keeping the air at 65° and the water 80° will induce the children to keep down in the water to keep comfortable.

1. The instructor will line up the class in the water, commanding absolute attention to the details as he performs the crawl land arm drill, either in the water or out, it matters little which. If the pupils have been drilled at school in the crawl land drill, so much the better. But don't waste time running them through the land drill now that they are wet. Explain the arm drill most carefully and over and over again describe and demonstrate the shoulder and wrist motions most minutely, as you are dealing with the most difficult actions of the human anatomy, far more difficult than the technic of difficult dancing motions. Explain the lowering of the head and the elevation of the mouth and nose to co-ordinate with the roll of the shoulders and the rotary action of the spinal column.

2. Have each child blow up one or two pairs of water wings and explain that they must be placed at the waist line and nowhere else. The object of the water wings is threefold: First, to force the pupil to the horizontal; (if one pair will not accomplish this because of the persistency with which the pupil holds one or two feet on the bottom, then use two pairs); second, in order to hold the pupil to one detail at a time, namely, the arm and shoulder action; thirdly, somewhat to retard them and slow up their actions so as to acquire the rhythm more readily. As a fear eliminator, I do not use water wings; furthermore, they in no way spoil the pupil, for as soon as the correct rhythm and style are acquired, the water wings retard the speed, and hence are discarded. The main thing is to see that they are not discarded too soon, or a ragged style may result.

3. After describing the shoulder action, pick out a likely looking child and tell him or her to swim around the circle in the proper order by the shoulder action, and just dragging the legs, which will be stretched out straight and kept together. (See illustrations.)

4. Start the entire class to do what the selected example did, or better, after making comments on his or her shortcomings.

5. Every now and then whistle and call the class to attention and further explain the stroke of the arms.

6. Pick out the best example and show him off and praise him, as children who have any life in them are very responsive to praise.

7. Dismiss every half hour.

VII. DIVING DRILL

Nearly every swimming pool, whether outdoors or indoors, and every boys' and girls' camp and summer resort has a low spring board. Any number from five to twenty could constitute a class for this drill, but certainly not over twenty, if that many, as only one person can use the spring board at one time. Very serious accidents may be avoided by making dismissal from the class for that day the penalty for diving in before seeing where the last diver comes up. By the teacher's being very strict and emphatic about this rule, scatter-brained pupils will learn caution.

After the coach has clearly described the details that must be observed in order to acquire correct control, style and form, run through the following dives in the order enumerated, having only one trial at each dive, the teacher or the best diver leading to demonstrate the dive:

Running swan; running front jack knife; running butterfly; running cannon-ball; running hoochie coochie; running Sol-Levi; running pilot; plain back; leaping far out and back; back jack knife; back forward; forward back; running full corkscrew; back corkscrew; running forward somersault; running forward somersault and dive (1½); running dolphin; standing sitting; standing sitting standing; back standing sitting; back standing sitting standing; side standing sitting; back standing sitting standing forward entry; hand stand; standing come-back or Isander; standing gainer or Molberg; running one and a half and half twist (with back entry); back somersault and dive (1½).

The coach can work his class for form at first only on the plain forward running dive, but boys get tired of it and want variety. I knew one coach who kept his boys on form diving for weeks, getting the boys to hit the board hard in an erect position and dive high in the air at first and enter for form. But I think, to get variety and versatility, it is better to keep the class on the four compulsory dives for a while and afterwards branch out into the voluntary. If this is

1. Hand Stand Dive

This dive may be made plain, or made from a standing or sitting position. The positions in the air may vary from a plain dive, as in (2), to a swan dive as in (3), to a somersault with head first enter into the water, or to a twist entry.

done, the boys won't all become one-type divers, or be poor at other types of dives.

From the 10-foot board have the class try the back jack-knife

2. Position in the Air from a Hand-stand Dive as in (1)

and the front jack-knife, followed by a half-twist entry. Work often on these two dives. They are not included in the illustrations but anyone can combine either of the jack-knife dives with a half-twist entry. Also, practise the running front jack-knife from the low

spring board, then follow with a half-twist entry. This is in order that the pupils may acquire a proper control of motion, as these are two entirely separate and different dives done from the same spring. This keeps the pupils from muddling or mixing dives. Each separate feature of a dive should be distinct.

A plain back dive made from a board 10 feet or more, looks very pretty turned into a back swan dive. In this form it is greatly improved.

The one-and-a-half back and the two-and-a-half forward should

3. Swan Dive Taken from a Hand Stand Position as in (1)

be executed from the 10-foot spring board because only very exceptional men can perform these dives from the lower heights.

Diving from a trapeze is very much easier than from a spring board but is not considered in contests.

Every now and then the American Swimming Association has to change a rule in order to conform to the Olympic rules, although the Association may not agree with the change. One change—a stupid one in my opinion—is doing head first dives with the hands at the sides, instead of having them up to protect the head.

4. Position on Leaving the Board for a Front Jack-knife Dive as in (5), or for a one-and-a-half Forward Somersault

5. Front Jack-knife Dive

Begin as in (4) and end as in (2). This is one of the compulsory dives in all diving competitions. The diver should jump up more than out.

A Very High Plain Dive Taken After the Position in (4).

By springing out and not downward, the diver keeps better control of himself in the air and avoids turning over and striking on the back.

The Neck Dive

If the height is sufficient and the board is springy enough, the diver may make a head first entry into the water (as in 2), instead of a feet first entry as is usually done.

THE SWAN DIVE

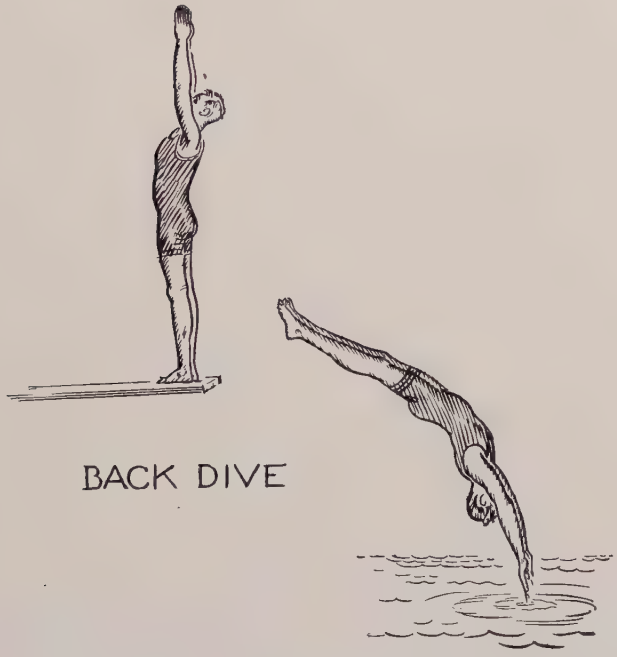
Swan dive from standing position on board. The running swan dive is generally the first compulsory dive performed at all diving contests.

The Arms Straight Ahead Swan Dive

The diver springs far up and out; and the back should have a decided arc before the diver turns the head downward toward the water.

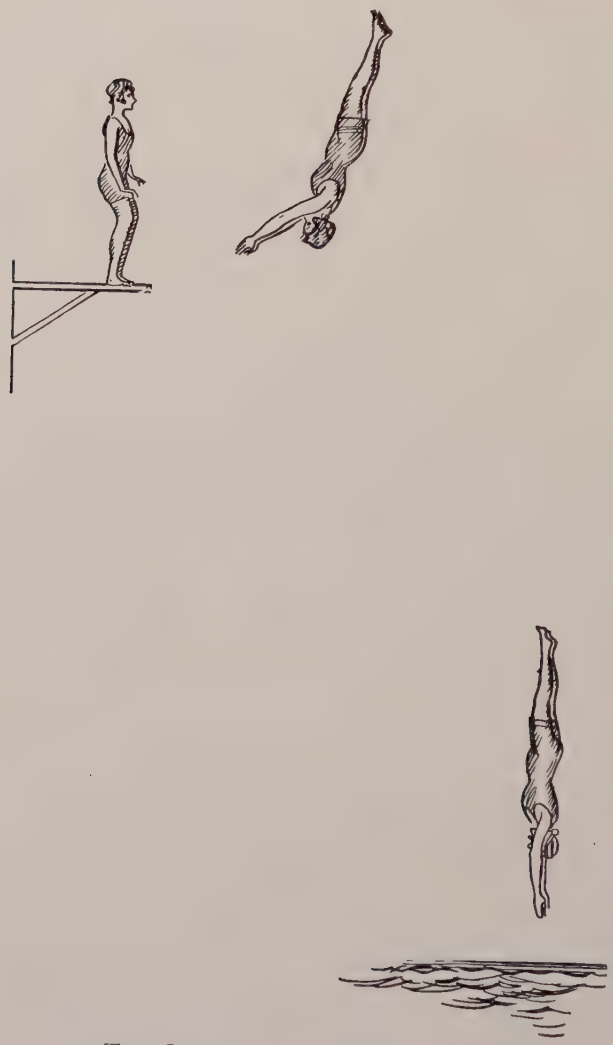
ANOTHER FORM OF SWAN DIVE

This looks well in the air when taken from a good height.



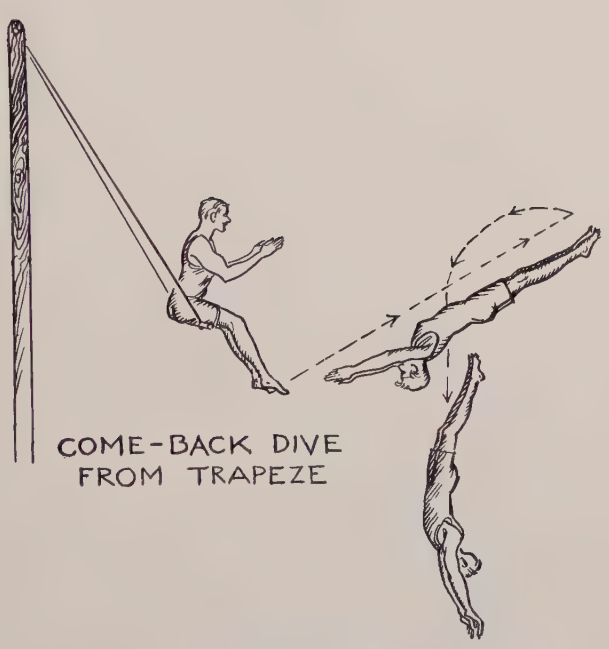
Back Dive

It requires a lot of will power to overcome the instinctive feeling that the head will be injured. In a back fall, the head cannot be guarded with the hands as it can in a forward fall. The only protection the diver has against injury to the head is to bend forward and strike the water in a sitting position, but this act of self-preservation would prevent the accomplishment of the dive. To overcome this feeling of fear, curve backwards as far as possible and spring as little as possible. Later, when more expert, the diver will spring more and curve less, thus diving farther out.



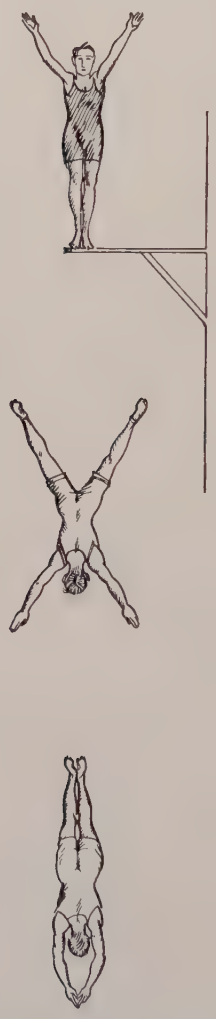
THE COME-BACK OR ISANDER DIVE

This is the test dive I teach my pupils. If they can perform this dive, I tell them they are real material for fancy diving contests and that I can teach them twenty-five dives from a low spring board. The mistakes a novice makes in this dive are: to lean forward when springing from the board: he must stand erect. To look down at the water: he must not look down, but should look up and think back. The worst error is to spring out and not up. By springing out, he comes down flat on his back. Practise the torpedo dive from the water level as a step toward the come-back.



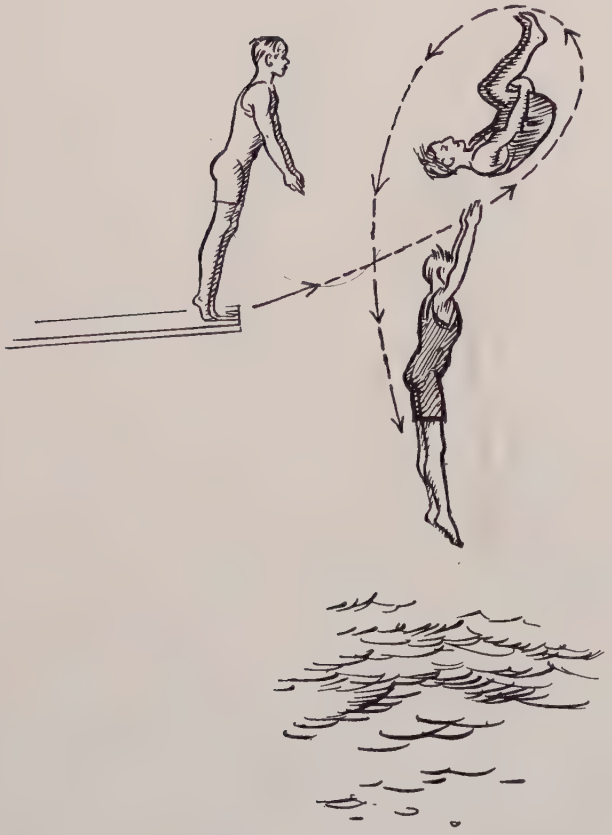
Come-back Dive from Trapeze

The come-back or Isander Dive is very much easier to perform from a trapeze than from a solid platform, standing, or even from a good spring board, as the outward swing sends the feet well up and out. A very easy way to get the come-back dive is to hang by the hands on a trapeze bar and throw the feet well up on the outward swing, falling back at the head and shoulders. The force of gravity will do the rest.



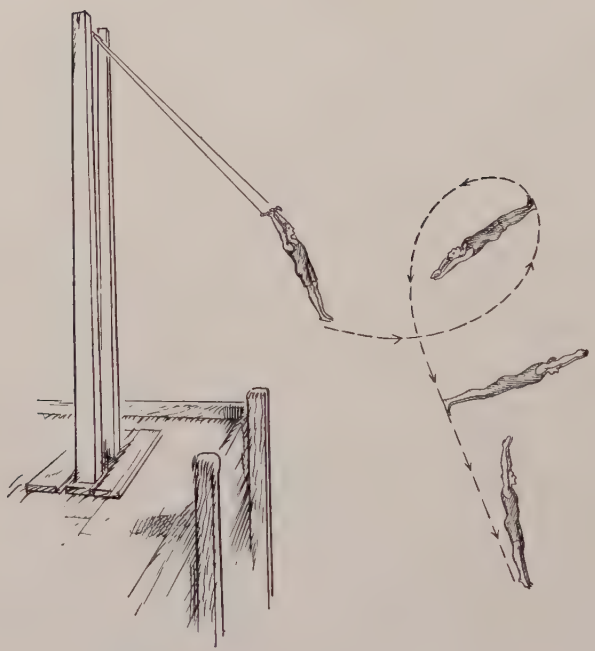
THE BUTTERFLY DIVE

This almost explain sitself. It may be performed from a low spring board from a run. The diver should spring well out, as well as up.



The Gainer Dive

This dive is so-called because "gainer" is the word used by tumblers when they perform a back flip so well that they go slightly forward from where they stood at the spring. If the feet strike the same place it is called a "spotter." A clumsy tumbler lands back of where he stood. This is not a dive in the proper sense of the word at all as it is a foot first entry into the water. It is barred at some contests.

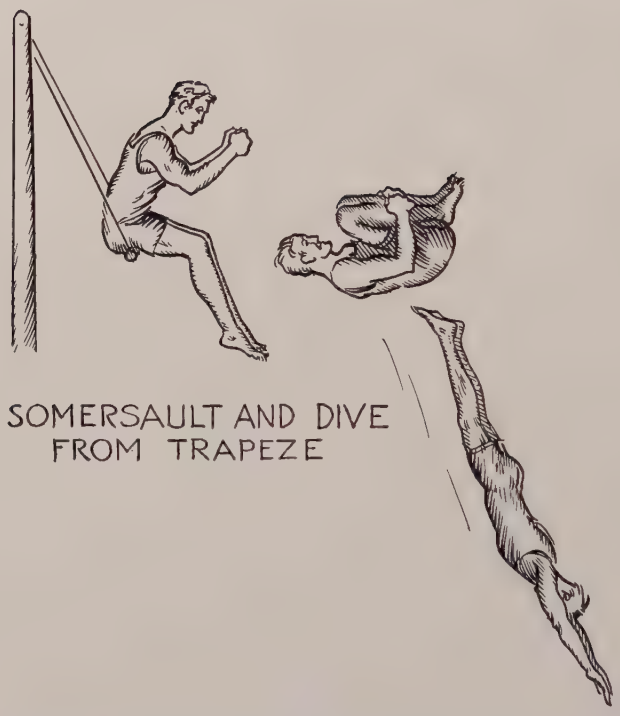


THE GAINER DIVE FROM A TRAPEZE

This is a very easy way to perform the gainer. A clumsy person who is strong in the arms and weak in the legs will find very little difficulty in performing this dive, as the trapeze does most of the work. While it looks spectacular, it is not a difficult feat; but to make another half circle and turn it into a true dive will call forth some skill on the part of the diver. To add a further half-twist on entering the water head first would be a real feat worthy of the best divers in the world.

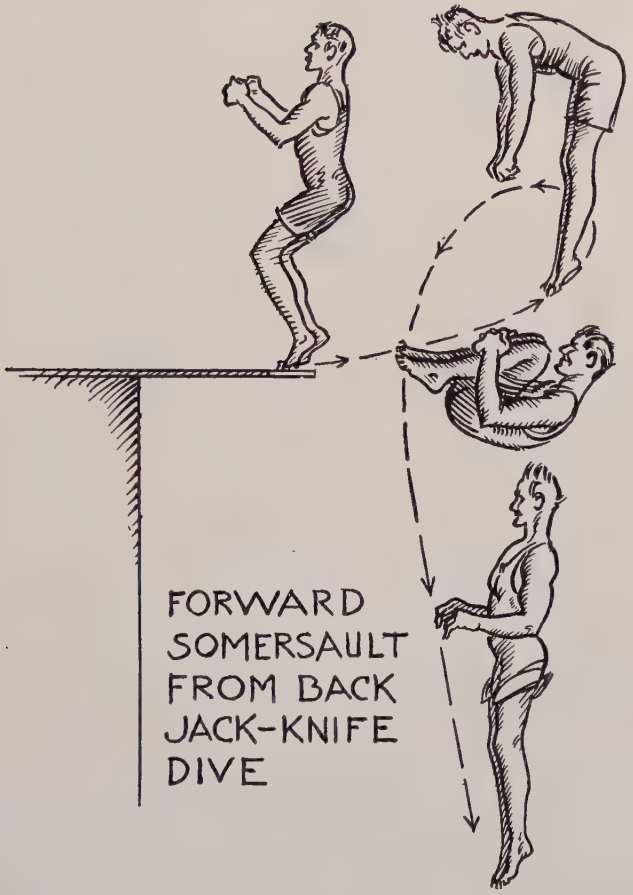
THE BACK JACK-KNIFE DIVE

A very safe dive to take from a height of from 30 to 50 feet. It requires less nerve than when diving facing forwards. This dive may also be performed from a board $2\frac{1}{2}$ feet from the water. It is one of the compulsory dives at meets.



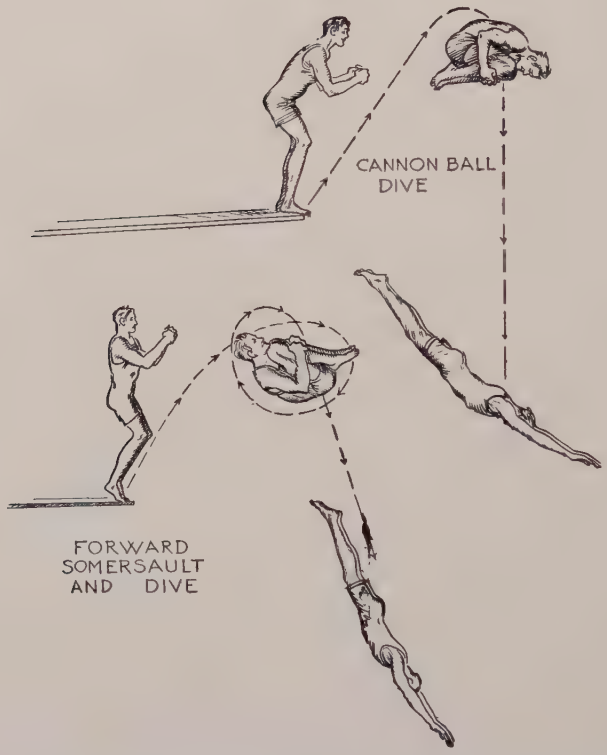
Somersault and Dive from Trapeze

Dives from a trapeze and from the double and single rings look spectacular but they are really much less difficult then dives taken from the spring board. Those who have very long legs and who cannot tumble, on account of their structure, yet who have the tumbling instinct, can perform splendid dives from the trapeze, as can also long-bodied and short-legged men.



FORWARD SOMERSAULT FROM BACK JACK-KNIFE DIVE

When the spring board is only $2\frac{1}{2}$ feet high, this complex dive is a very difficult feat to perform. It requires quick snappy action. Anyone who is accustomed to perform this dive and who discovers he has lost his ability to do it, is accumulating auto-intoxication and he had better read the chapter on training. Another half turn will make it a head first entry.



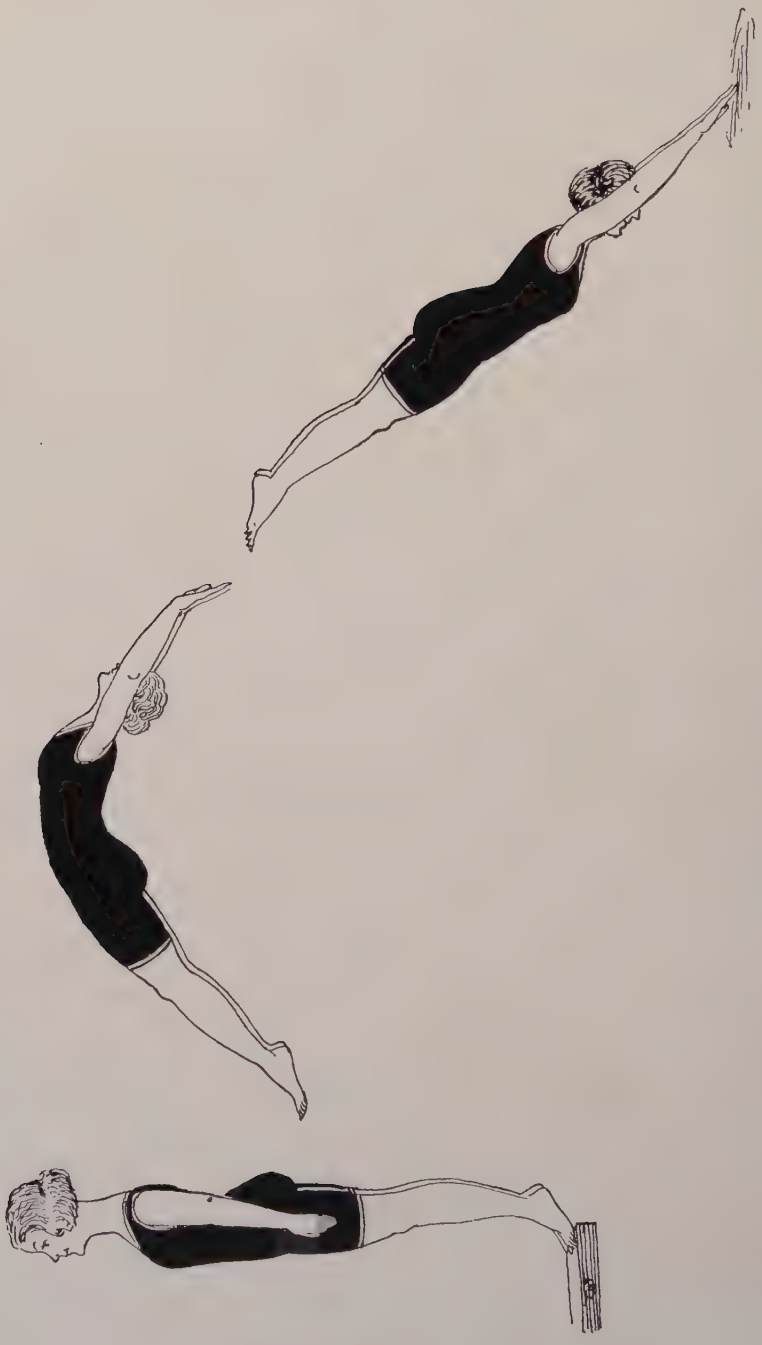
CANNON BALL DIVE AND FORWARD SOMERSAULT AND DIVE

The cannon ball dive is a splendid preparation for the novice who is trying for the one-and-a-half forward somersault and dive, as there is no difficulty attached to it. The best way is to take the dive running. To take any kind of running dive: spring off one foot high up and land down hard on two feet, then aim high rather than out. The cannon ball dive is a novel dive when taken from a 10 meter platform but it can easily be performed from a $2\frac{1}{2}$ foot spring board.

In performing the one-and-a-half, remember that the body ceases to turn when it is straightened out and it rolls while tucked up. The cannon ball position is a splendid protective position to assume when the balance is lost and the diver is a good height from the water.

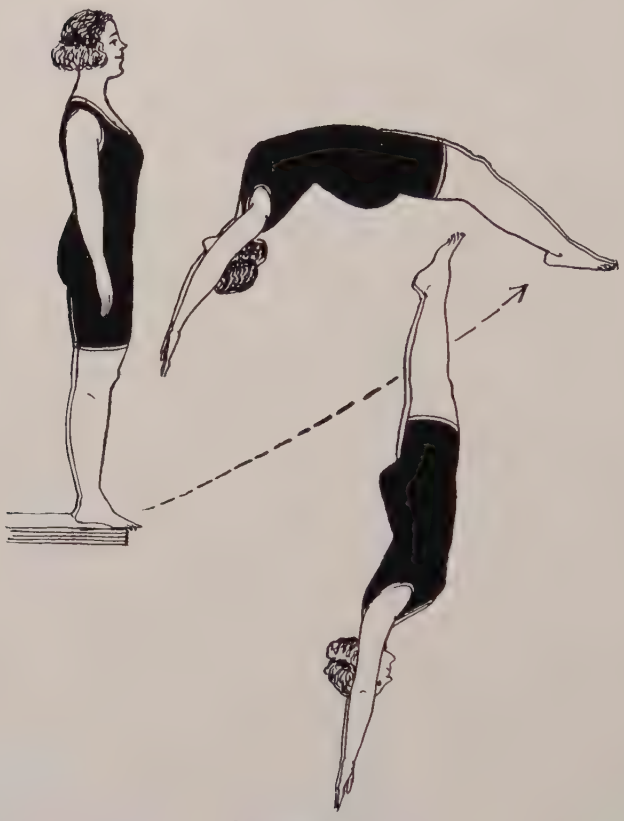
Forward Screw Dive

Backward Screw Dive



BACK FORWARD OR HALF CORKSCREW DIVE

One-and-a-half Back Dive



Dolphin Dive

Airplane Dive Banking

PIKE FORWARDS, DUTCHMAN AND FULL TWIST—THREE-IN-ONE DIVE

The Plunge for Distance

The plunge for distance feat requires a man of so abnormal a build that many universities and nearly all high school contests eliminate this contest entirely. The man who floats is more like a woman in build; his feet must float or he cannot drift after his plunge into the water. In plunging, an extra large man throws that much more weight against the water, hence he can go as far as seventy-five feet without motion of any kind, except to stretch himself straight and stiff. Some have actually done the seventy-five feet in thirty-five seconds, a truly wonderful feat. This has been done in the Yale pool. Allowing twenty-five seconds more of a drift, the same person could probably plunge one hundred feet in one minute. One minute is the time limit allowed in this contest.

A person must be built for this feat for no amount of coaching will bring results. The feet of the average or normal man sink and he can rarely plunge over forty feet. In a woman's contest this feature should go well. Have the contestants line up at the deep end of the pool and plunge together. Have only two trials. The contestant must always keep her eyes open after hitting the water so as to keep a straight line, as striking the sides means disqualification, as does turning over. To spring out as far as possible without hitting the surface flat sends one the farthest; this gives a curve, and as one travels faster under the water than on top, distance is gained. Always take enormous huge breaths until nearly dizzy, before plunging, as this enables a contestant to hold the breath long enough to drift to the limit of the time allowed, one minute.

The Racer's Plunge: In this entry into the water the racer should avoid the old flat style of hitting the water a flat slap, but should make it a skimmer dive, being completely covered. In this way the racer drives faster and farther ahead. A violent wiggle of the feet should ensue after eight feet of drift has been accomplished but arm action should be avoided for some distance. The hands should be close together, even one on top of the other, and the head should be held well in between the arms, thus making the body as narrow as possible. Much distance may be gained when the racer's plunge is well performed. Huge breaths of air should be taken by the racer while waiting for the gun to be fired; many young swimmers, who are pent up to a point of excitement and nervousness, indulge in breath holding to a nervous tension that is ridiculous as

well as injurious. Do your best to beat the other fellow, but don't punish yourself to do so, as the spectators very often forget all about

READY FOR THE MASSED DRILL

Sixty swimming instructors of the future, lined up, ready for the course in swimming instruction.

the contest the next day and you aren't so much of a wonder even if you do win.

VIII. SPEED SWIMMERS' DRILL

1. Line up the class on one side of the pool—if pool is 20, 25, 30 or 35 feet wide—and have them take a good toe grip of the edge and assume a racer's plunge crouch. At the command "go," all spring across the pool touching the other side without any leg or arm action whatever. The object of this is to develop length in their starting plunge by getting out as far as possible, as quickly as possible. The pupils should hardly wet the back but skim across the top of the water by leaping horizontally, after losing their balance from the toe grip on the edge; a sharp edge is best to spring from and not a rounded edge which gives no toe grip, and the racers are likely to slip backward and strike their shins. Climb out and repeat as often as necessary. The loud sounding splash counts nothing against the pupil; and the harder the spring is made, the softer the blow on the chest and abdomen is felt. Many a race has been won by a good racer's plunge.

2. Line up the class as in 1, and start in the same method. If the pool is not over 20 feet wide the stroke of one arm should be sufficient to reach close in to the opposite side for a racer's turn, which being performed should send the subject back to the starting side without leg or arm action. Repeat this across the pool and back again by the racer's plunge and racer's turn until grace and speed are acquired. (See illustration of the racer's turn.)

3. To develop the leg driving power of a crawl swimmer, line up the class in the water at the shallow end and have them place one pair of water wings at the waist line and hold another pair by the narrow part in both hands fully extended out in front on the surface. At the command "go" the swimmers in very close formation work the legs by the flutter kick while stretching the arms and legs to the uttermost. (See illustrations in Chapter III.) The pupil with the best style will always arrive at the far end of the pool first. Teach the class to breathe extra deep and not hold the breath, as is the tendency of all to do at first. This is a very exhausting drill. After a little rest, repeat.

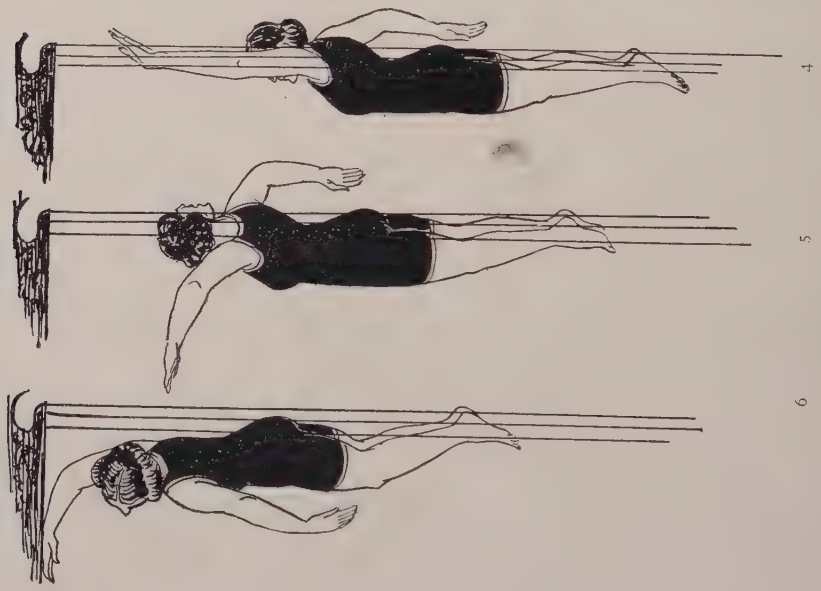
RACER'S TURN FOR THE RIGHT-HANDED SWIMMER

1. Drifting towards the wall at the end of the pool.
2. Bend the right wrist so as to grip the water.
3. Shove the water rearward with right arm.

4. Have the class line up in the water at the deep end in fairly close formation but not as close as in 3, and steamboat on back the length of the pool. (See illustrations in Chapter III.)

5. Line up as in 4 but not in as close formation and swim the length of pool by the back crawl.

6. Have the class line up as in 5, but along the length of pool, and at the command "go" all swim across by the back crawl and make the official back turn and return. Have the pupils spring well



4. Finish stroke with right arm and raise the arm.
5. Sweep water back with the left arm; take in air.
6. Place back of right hand to wall so as to keep close against the wall and not shove from it.

out on the start and make the first stroke with both arms, immediately following with the alternate overarm back crawl.

7. Have the slowest swimmers line up (out of the water) at the deep end of pool and swim a one length race.

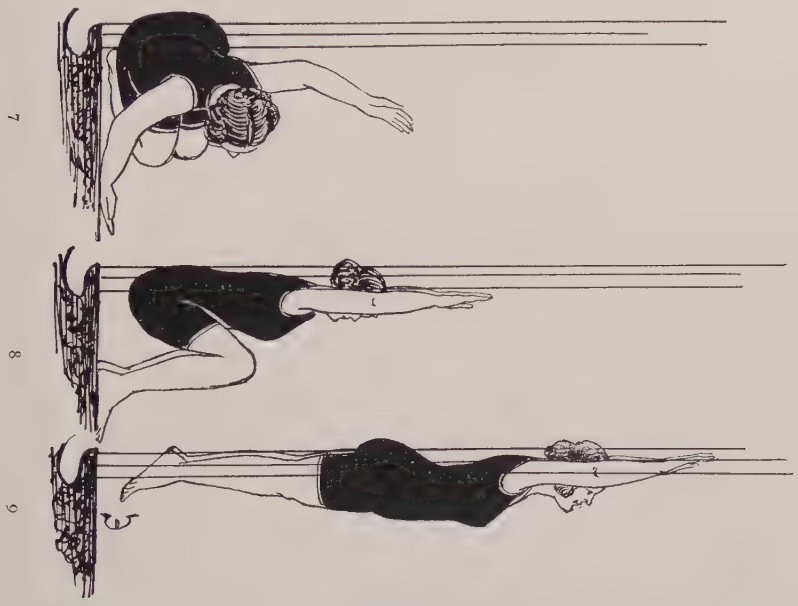
8. Have the intermediate swimmers line up at deep end (out of the water) and swim a two length race.

9. Have the fastest swimmers swim a three length race.

10. Finish with relay races of two lengths and two or three

sides, according to the width of the pool and the number in the class.

Let the motto be: Aim for style, get speed next.



7. Draw knees up to chin so as to turn quickly; give the water a snappy movement with left hand so as to spin the feet to the wall; push the water back with the right hand so as to keep close to wall.
8. Right hand meets the left hand; feet placed to wall.
9. Shove very hard with both feet from (8) to this straight position and drift, or if in haste in a race, wiggle the feet violently while the hands are held straight ahead for a space determinate upon the individual. The plain drift is the more restful.

NOTE.—The left-handed swimmer—one who swims with the left arm up on the side stroke, using the right leg in the scissors kick—should turn to the right, breathing in on the left side, that is, turning the mouth to the left.

IX. COACHING FOR CONTESTS

All coaches are interested, quite naturally, in those who are structurally favoured for speed swimming, fancy diving, plunging, and playing water polo, though I admire most a coach who takes a poor bunch and so improves them that they beat a better team by their brains. High schools and universities do not generally "buy" outsiders as many clubs do. Some coaches do go out and scout for boys here and there, trying to get them to come to their school; if the expert and promising boys accept, their old coach has done all the hard work of bringing them on, although the new coach receives the credit. It is only lazy coaches that steal the work of other coaches. Generally the material from which the coach may pick is of the raw type, and what the pupils do must be the result of the coach's work and development. As his is all the responsibility, the keen coach will be very particular about the training of his men, women, or boys. He will carefully guard their actions while away from his sight and advise them most emphatically as to their habits in eating, drinking, smoking, drugging, sleeping, etc.

The coach who wishes to succeed will himself be a sample of clean living. I am rather inclined to think that a man of rather delicate strength is better fitted to coach a team to its highest capability than a big, strong, coarse man; for the delicate man well knows the penalties of the slightest diversion from the right hygienic methods of living; while, on the other hand, a very strong man cannot recognize so quickly the necessity for avoiding this or that evil. It may often be necessary for a particular coach to write to the parents of some members of his team suggesting that they help him develop dynamic force in their children. By doing this a coach could also train up the parents in right methods of living and accomplish a very much needed reform.

A good coach will have his team in such shape that no member will collapse at the finish of a race, no matter how terrific the pace. A contestant who wins a race by a foot or a yard and then collapses, while his opponent is still in good wind and fettle, has, in my opin-

ion, lost the race; as pity and not admiration is the attitude of my mind toward such a winner.

A coach should have a high instep because men who have flat feet cannot stand walking around on hard, damp pavement, such as surrounds all swimming pools. Even wooden shoes do not overcome this defect. While flat-footed men swim easier and faster than do men who have high insteps, yet the latter are better for such work.

In my opinion, women should not be trained for hard, strenuous swimming sprints. Contests between women's colleges and clubs should be confined largely to fancy style and grace, rather than to speed. And the coach who stands out for this kind of contest will be well upheld by the audience, as such events are of great interest, and far more women will enter them than when sprints alone comprise the meet. Then, again, novelty and ornamental swimming are women's specialties and they far excel men in such events; and their skill is greatly admired by the men in the audience, as it is human nature to admire that which we are unable to do ourselves.

The high school coach, when confronted with the rule that each contestant may enter in two events only, including the relay race, will, of course, pick out his four fastest swimmers for the 200-yd. relay race, as this event means 8 points, or nothing. This will mean that each relay man will be allowed to go into only one other event; therefore, the coach must use good judgment in the dispersal of his men. He will give much consideration to the placing of his men in order to win the meet, keeping in mind that the average meet has, besides the 200-yd. relay race, six other events, each of which gives 5 points for 1st place, 3 points for 2nd place, and 1 point for 3rd place, or 54 points more to be divided between the teams, besides the 8 points for the relay race. This will cause the careful coach to consider well whether his men can compete more favourably in the 100 and the 220-yd. events, or in the 50-yd. sprint and 50 yds. on back. As a general rule, the relay should be first, then the diving; next, the 50 sprint, followed by the 50 on back; then the 100; then the plunge (if it isn't eliminated), and, finally, the 220 yds. At some meets the back race is made 150 yds.; the 220 yds. is eliminated for the 440 yds.; the plunge for distance is cut out altogether, a breast stroke race being substituted for that event.

Races are often very unsatisfactory, not only because of the poor racer's turn at the end of each length, but of the get away after the turn. I would advise the coach to have his swimmers work back and forth across a 20-foot pool, making the distance on half a

stroke, that is, only the one arm coming over the water; and that the arm on the side on which the swimmer breathes. Thus, the swimmer, who breathes in by turning his head down and his mouth up to the right, will turn to the left to make the racer's turn. He should sit tight against the wall and get well fixed by having his head well in between both arms. The arms should be so stretched and close together that one hand is on top of the other. In shoving off from the wall, the swimmer should drive his body 20 feet across the pool by terrific leg action alone, while the other 5 feet will easily be accomplished by the stroke of one arm only, or by what I call half a stroke. A full crawl stroke means a recovery with both arms. This practice back and forth across a 25-foot pool will develop great driving power in high school boys and stop fumbling at the turn. On arriving at the end of the pool an extra huge breath should be taken, without a stop, however, of any appreciable duration.

From the shove-off at the ends (not from a dive), a swimmer who has a perfect crawl should take seven strokes to go the length of a 75-foot pool. A stroke is a complete right and left arm action. The action of the two arms constitutes a stroke; not that of each arm. A man swimming regularly in a 75-foot pool can so time himself for the turn, on approaching the ends, that he need hardly use his eyes to know when he should make the turn; by further practice he will find he need not count the strokes, as even this will become automatic on his part.

In selecting his divers, the coach generally takes those who cannot become tiptop swimmers. In this he is usually right, as the great majority of divers are rather indifferent, and, indeed, often very poor swimmers. Diving has nothing whatever to do with swimming: the two are as far apart as the poles—the poles are both located in the ocean, swimming and diving both have to do with water. The coach will always give his pupils a test and try them out. My advice is: start them for form only; give them the form dives by getting them to try the swan dive for fine style; then, the front jack-knife dive; next, the plain back dive, and last, the back jack-knife dive. Work the pupils out on these four compulsory dives to much thoroughness before carrying them on to the more complex, difficult, voluntary dives.

Impress upon the mind of the pupil that whether he is performing a dive from either the low or from high spring board, every dive is distinctly divided into sections: (1) standing position on board; (2) the run; (3) the spring high up in the air; (4) the landing

hard on the board with both feet; (5) the high throw up in the air; (6) the positions in the air; (7) the turn of the head towards the water on the descent; and the turn of the head if a twist dive; (8) the angle at entering the water. All these mean distinct movements, not a jumble of movements. Each movement should be clearly discernible.

Start of the Race

The coach should see that his men are properly advised not to stand at the "take off" nervously holding their breath and tensing their muscles in expectation of the gun signal. Rather, they should load up deeply with air and gather force for the race. They should be advised also against shutting their eyes and losing their sense of direction in a race. The back race swimmers should watch the ceiling and note the end marks, especially in a strange pool. The coach should call a rehearsal, running his men through the meet, two days before the event is scheduled.

Speed

When a high school boy can swim the 220-yd. race in the 2.30's he is promising material for still better time when he goes to the university, or when he leaves high school, although some reach their highest speed while at high school and then recede. This is usually because of stumpy growth, or because the boy has acquired some bad habit.

The 25-yard pool will show the boy who can negotiate the 220 yds. in 2.32, and the one who can do it in 2.35, as is shown in the following table; the time is shown at the end of each length, cutting out fractions of seconds for convenience:

Yards	Time, 1st boy	Time, 2nd boy
25	.12	.13
50	.30	.33
75	.45	.48
100	1.01	1.05
125	1.20	1.23
150	1.39	1.42
175	1.97	2.00
200	2.16	2.19
220	2.32	2.35

Now, the coach can discern where the boy falls down on speed. If at the end, it is because he tired; but if the lack of speed shows all through the distance, as above, it requires a steady increase from start to finish in order to get down towards the world's record time.

Another boy did the 150 yds. on back in the following time:

25	yds.	in	.15	sec.
50	"	"	.35	"
75	"	"	.55	"
100	"	"	1.15	"
125	"	"	1.39	"
150	"	"	1.53	"

The coach must be particular to even the smallest details, as very often a very small difference will win a race. It is important not only which way a swimmer turns but also which arm he pulls through the water first; a right hand swimmer, that is, one who scissors with the left leg under going back, who breathes, as a consequence, by turning his mouth to the right, should always pull the right hand and arm back for the first stroke after the turn is made at the ends, and vice versa. This means there will be no confusion or hitch in the breathing rhythm.

Also, it is a very good idea, when time in the pool is very limited, to have two coaches, one for the divers and one for the swimmers.

A clever person can really learn a great deal in the way of teaching others from this book. I know persons who knew nothing whatever about swimming, who read my old book, "At Home in the Water," then went to work and turned out scores of fast swimmers.

I was once called in to advise about a boy who had promised well but had suddenly stopped progressing when he was sixteen. This frequently happens; always from some cause that can be remedied. In this case, the boy had a short, thick neck and made only a part, upward turn of the right shoulder and consequently too shallow a stroke with his left hand: he neglected the walking-beam action of his shoulders for the front crawl. He did not reach in deeply enough with the left hand to put on a sufficiently heavy drive. He breathed in on the left side and would turn his face only a little way to the right to exhale. I got him to turn his face more to the right. This correction threw his left hand deeper into the water and sent him so ahead that he knocked three seconds off his time in the 220 yds.

Massage

Massage must be given not only scientifically, but by a person of healthy disposition. The coach who is critical, not overly given to praise, unkindly of feeling, should eliminate massage as it would be of little or no value. For massage to be of real benefit, there must be sympathy between the coach and his men.

Massage is of great value to the contestants if given just before the contest; also if given immediately after a race if another race is pending. This puts pep in the contestants. Massage should be given to the shoulder and upper back muscles. At the finish of a race, the thigh muscles are greatly invigorated for the next race if they are properly massaged, especially if the swimmer complains of those muscles being tired.

X. TEACHING CHILDREN

There is an extraordinary difference between small children when it comes to instructing them in the art of swimming. Put one hundred small children in a massed class for swimming instruction and you will find almost 57 varieties of them to battle with—for it is a real battle. You will find some so bashful that much care must be taken at first not even to look at them, or you—the teacher—will scare them into a panic. Then there are the wilfully determined obstinate ones; these also must be ignored. But all are children, and though I give a most careful explanation the only response I get from small children reminds me of a lot of worms—they wiggle. The words: "long," "short," "fast," "slow"; "wide," "narrow," "deep," "shallow"; "snappy," "hard," "easy," etc., mean nothing to them as they would to adults. And the common idea that small children are easy to teach to swim is absurdly far from the fact and simply shows how densely ignorant the great mass of people are in regard to the art of swimming. Time to a child is nothing; and to the parents of no value insofar as the child is concerned. The hundreds of hours of practice that children spend in the water in the form of play are not at all understood by adults. Adults are far less trying on the nerves of the instructors, as they pay attention and come to order. But children have one very great advantage over adults—they are supple and flexible. And great flexibility is of immense advantage to the graceful, easy swimmer. Then, children have another advantage over adults—they are much shorter coupled and the distance they have to make to complete their movements is very much less than is the case with adults. The stiff-jointed, muscle-bound adult has no similar type in childhood.

To get the complete confidence of the entire class should be the first aim of the teacher of children. Small children must be spoken to in the most cheerful, optimistic tone, with a ring of joy in it that will at once swing all into a mental attitude of play expectation. A joyful ring of laughter should greet the crying or whimpering child. At the same time, explain to the rest of the class that some

children fairly cry with joy and that little Becky is just overcome with joy for the time being. This whole ordeal of getting acquainted with your pupils has absolutely nothing whatever to do with the fear elimination drill that will follow immediately afterwards; but is merely a little confidence chat that should take only a few moments and may all take place on the way to the water.

The best situation for small child instruction is the warm, clear, clean, shallow beaches where the hot sun shines down and drives the sweltering children to like the water. The depth of water need not exceed two feet, for in water a yard deep and less a giant may be taught the entire art of swimming. The small children should at first all be placed on their backs in water a foot deep and be taught to straighten out flat and horizontal, while keeping their hands on the bottom. Now, it will be noticed that they all want to bend, thus turning the mouth down and the top of the head high. Teach them to straighten the hips up, hold the top of the head down and turn the mouth and nose up. For the obdurate ones who do not respond, back them into water eight inches deep where they can rest the top of the head on the bottom and relax the neck muscles and submerge the ears; this last many of them don't like to do at first.

Next, have the class all roll one way on their front, place their hands on the bottom and learn to breathe properly. Teach them by example to open the mouth and take in a deep gulp of air, then close the mouth, keep it closed, and submerge the face in the water and blow all the air out of the lungs underneath the water, making bubbles. Have the class repeat this a score of times.

Then teach the class not to raise heads out of the water in order to breathe but to make a rotary movement and turn the head down and swing the mouth up and fill up full of air; then make another rotary movement and turn the face down and blow out the air. Teach them that the top of the head is not the point at which air enters the lungs and that holding the head highest has caused the drowning of thousands of persons.

Next, teach the class the flutter kick on the front, still keeping the hands on the bottom and the head towards shore. The flutter kick is the crawl kick or wiggle or thrash of the legs. In shallow water, the error of drawing up the thigh by flexing and making a back and forward movement cannot be made as the knees would strike the sand or bottom. Even very small children learn the flutter kick almost immediately. Keep the ankles at full extension

and never move the ankle. The water should "boil" at the feet and the feet should be kept in the water.

Next, have the class turn over on the back again and do the crawl kick in that position; this is even easier than on the front.

Teach the children to scull on back towards the shore; this is swimming with the arms only by an outward and inward movement of the hands from and to the thighs after the manner of sharpening two table knives. This is the easiest thing to learn in the art of swimming and should always be learned first, as it is the method to fall back on in case of emergencies, such as cramps, or the legs being wounded or shot off, or bound up in a hobble skirt, or if you are just tired and wish to rest, as it is not much more than the expenditure of a mouse power of force.

Next, teach the children to "steamboat" in toward shore. To "steamboat" simply add the flutter kick to sculling on the back.

The next step after this, is the back crawl. It should be taught before the front crawl. It is an exceedingly graceful stroke and very much easier than the front crawl. Also, the fact that the same identical set of muscles is used in the back crawl as in the front crawl, makes it a most helpful stroke towards learning the front crawl. The use of water wings will greatly assist in acquiring the proper arm action of both the back and front crawl strokes.

On no account teach any child the old breast stroke unless you desire to ruin it, as only very versatile children can overcome the terrible handicap of that crazy old stroke. Over twenty years ago I told Englishmen that they would have to come over to the United States to learn to swim if they persisted in teaching beginners that ridiculous stroke.

But I would go further and advise that the side underarm stroke be taught after the front crawl has been thoroughly learned.

Next, have each child supplied with one or even two pairs of water wings and have them all swim one way in a big circle by the front crawl arm movement. This is the most difficult detail of the whole art of swimming to learn, or teach, and it requires a great deal of practice. I am positive that I can teach 100 girls the back crawl stroke, and perfectly at that, in the same time that I am getting one girl to do the front crawl stroke; and I could even make that number 1000 to 1.

Now the use of water wings will at first frighten the pupils, as they throw the feet up and the face down; but this is the very object I desire, that they shall assume the horizontal. I never use

water wings in my fear eliminating drills, but as a short cut to learn rhythm and detail they are useful.

With the exception of the front crawl, all the above massed drill may be taught a single child in a bath tub, while the other children look on and take an observation lesson as they await their turn.

Larger children I run through the same drill, my method differing very little. Large classes of unruly boys I hammer into attention by dismissing immediately the noisy and boisterous ones. When boys behave like this, it is due to fear of the water, and they try to divert my attention from this failing by shouting at the top of their voices. But I rule them with an iron rod and the next time they enter my classes, they are like lambs.

There are two reasons for strict discipline. One is that swimming instruction might be the most important lesson of a life time, as persons drown from only one cause, namely, inability to swim, and I keep strict order in order to teach them what may save their lives. The other reason is that to teach large classes good discipline is necessary. Often I have been called upon to teach 1000 boys a week in afternoon classes; the Saturday morning following the fifth lesson a test of their ability to swim will take place. Then all are expected to swim the length of the pool. To attain such results, strict though kind order is imperative.

Swimming pools are all built far too deep, in Y.M.C.A.'s, Y.W.C.A.'s, and high schools. From 2 to 3½ feet of depth is enough, except at the diving end where a spoon-shaped hole may be made for diving, say of 7½ feet in depth.

XI. WHY WOMEN SHOULD SWIM

Swimming is the ideal sport for women, for many reasons, one of which is that it is the one sport in which they can excel men. The condition of this excellence is that swimming is more a matter of rhythmic motion than of violent muscular exertion. Whether or not women are quicker at catching on to rhythm than men and for this reason learn more quickly than men, I am unable to decide; some women seem quicker at learning, some not. Women have other advantages over men in the water. They can stand cold water very much better than men, as even thin women have a layer of yellow adipose just under the skin, which keeps them warm, and the most attenuated woman by swimming the crawl stroke will develop a rounded form with fat enough to keep her warm. Women are much more supple and flexible than men and this flexibility helps them to swim easily and gracefully; stiff, muscle-bound men, on the other hand, have a difficult time learning to swim at all and never succeed in swimming with ease and beauty. In the water, women are far more buoyant than men and this buoyancy not only makes for grace in the easy gliding, drifting features of swimming but also helps them plug long distances better than men. The shape of a woman is more nearly that of the tapering seal than is the angular, bony build of a man; again, the advantage is with women swimmers.

While men can excel women in the sprints, as may be observed by the fact that women are eight seconds slower in the 100 yds. free style than men, yet in the back racing stroke women are only one-fifth of a second behind the men's record and in the aggregate women excel in this style of racing. At performing fancy, trick and ornamental swimming stunts women far excel men.

There is a very distinct difference between the choice of sides when swimming on the side stroke as most women swim with the left side up and men with the right side; thus the majority of women are left handed at swimming.

It is quite true that a woman is in danger of drowning in water a

yard deep if she has not had five minutes' instruction in how to get her feet on the bottom, as the feet of most women float, and a woman will often strangle to death trying to stand up, and that, too, sometimes in the midst of crowds of people, as the mass of people never suspect that this bather has perhaps entered the water for the first time in her life and cannot place her feet on the bottom. On the other hand, men envy women for the fact that their feet float, while theirs are like anchors and they find little trouble in placing them on the bottom at the first trial. To place her feet on the bottom is the first lesson a woman should learn, as one who cannot do so will have a terrible dread of the water. To do this she must be sure not to lift her hand or hands out of the water, as this will drown her, but to keep both hands deep in the water, and flat open, and strike the water in any direction whatever, while at the same time drawing her knees toward her chin, and then placing her feet on the bottom; she must neither breathe in nor out during the proceeding but keep her mouth closed. It takes only a moment, and is so very easy that most people think nothing of it, but I feel sure that millions of women have been drowned in water only three feet deep, as in my life time I have known of several score of women meeting death in three feet of water, and, on several occasions, even of double drownings.

When the public school boards erect shallow swimming pools in all the public schools in the country, then everyone will swim; and there will not be a single exception. We don't require a Rockefeller Foundation to inaugurate this, but only the use of our own common sense and the facing of our own responsibility toward the coming generation. I actually heard one public school trustee say that God made man a land animal and he had no business in the water. Immediate removal from his position for such an utterance should have been his fate in my opinion, and also the fate of all others who do not stand up for the principle that from now on all public schools must have shallow swimming pools. That is the only cure for our dreadful ignorance of the art of natation.

Some Y.W.C.A.'s still employ instructors in the art of swimming who teach beginners the crazy old breast stroke and terribly handicap them for future speed and grace in the real art of swimming. The reason they do so is because the board of lady trustees are not swimmers themselves and don't know the first principle of the art of swimming. Everyone but the appointee objects, but as the instructress is affable and really ignorant herself of the damage she

is doing her pupils the trouble continues. Many a poor woman has drowned as a result of this crazy stroke, trying to spread her knees apart to perform the frog kick when thrown into the water with her clothes on, for, while she could swim the stupid stroke in her bathing suit, she becomes all tangled up in her skirt when she attempts it in her full skirt. I should say, at a most conservative estimate, that enough women have been drowned in the old long skirt to people the United States. Put a man in the skirt of thirty years ago and though a good swimmer he would sink completely exhausted after a distance that he would usually consider play to swim.

Swimming will put women into a robust condition quicker than any other exercise! I say this from my very long experience in teaching women in universities, in Y.W.C.A's, and at the Battle Creek Sanitarium. At the last place, where I taught for ten consecutive summers, many women were brought out and placed in the swimming pool by attendants, far too weak to stand up, much less take exercise. And these women could swim all over the pool, 35 by 70 feet, on the back strokes, while many perfected the back crawl stroke known as the back racing stroke, in my opinion the most graceful of all strokes. These invalid women could not stand the strain of exercise on the perpendicular because of the strain on the heart, but could very easily lie down on the horizontal, in a bed of water, and, by direction, move with sufficient skill to master several strokes. Moreover, very delicate women are always very light on the water and, without exception, float very easily, and thus a very light exertion will propel them along.

Then why are doctors perpetually forbidding sick women to indulge in swimming? Because doctors, with very few exceptions, know absolutely nothing of the muscular movements required for swimming; they imagine the unnecessary, terrific hard exertions made by a clumsy man are typical of swimming. Of course, for an inexperienced woman to attempt to swim without the guidance of a teacher is unsafe; the strain on her heart would be tremendous, as the mere holding of her breath would exhaust her, let alone the unnecessary movements that an unskilled person would make. But these movements are far from the correct swimming strokes. Let us get every woman in the country robust, is a good rally cry! Gardening is certainly a very pleasant and useful method of regaining one's health, but swimming is quicker. I challenge the statement

that there is a better method than swimming. This may be readily understood if we but pause for an instant and study the anatomy of a woman and watch the powerful therapeutic force at work when she gets into action on the crawl leg drive. To centre action on this detail, take two pairs of water wings, place one pair at the waist line and hold the other pair out far in front by grasping the narrow part of the water wings with both hands so as not to get any propelling assistance from the arm action, and by the flutter kick, also known as the crawl thrash, move forward through the water by leg action only. Now, this is not a mollycoddle affair, as the strongest men in the world very quickly become exhausted by working this detail of the crawl stroke. But notice the wonderful effect of this action, the enormous deep breathing, thus opening up the very bottom of the lungs. Take particular note of just what muscles actually perform the crawl leg thrash. In this action the feet should be kept in the water and the water should "boil" at the feet. Thus are brought into play, or action, the upper thigh muscles and the lower abdominal muscles and even the psoas muscle (tenderloin). This action tends to draw up into place all the pelvic organs; in my experience while giving swimming instruction at the Battle Creek Sanitarium, I have known many cases of prolapsus, anteversion and retroflexion which were thus corrected.

Then, again, note the great play of muscular movements in the upper and lower chest walls in the crawl shoulder action, as well as the splendid rotary action of the spinal vertebra, resulting in auto-chiropractic actions that correct round shoulders and all manner of spinal curvatures. Let us thoroughly understand that there is not, in all our outdoor activities, anything to be compared to swimming as a restorative to the young woman whose bones are not yet tight set, or for that matter, even if they are.

Swimming greatly strengthens the heart. It is very rare indeed that a heart is so weak that swimming must be denied. We must remember that the heart is a perpetual motion machine and is strengthened by a rest, not by a whip; and there is no more restful form of exercise that we can indulge in than swimming, because it is on the horizontal.

Women must understand that while swimming has a reducing tendency, it also has a very fattening tendency. Women who wish to tear dangerous internal fat off themselves by burning it up should sprint by the crawl and race long distances. But if they desire to build

up, they should use the trudgeon stroke and thus acquire the more restful scissors kick in the place of the crawl flutter. One can swim all day long and not get tired using the scissors kick, but the flutter kick uses up energy by causing ultra deep breathing.

Women will find swimming tremendously strengthens the entire abdominal wall, so that those muscles will become so strong that the use of corsets will be absolutely unnecessary. Flabby tissue is rapidly replaced by solid, firm tissue of sufficient hardness to sustain an erect carriage. Everyone has noted the wonderful grace of carriage of all women swimmers. This is the result of the trunk exercise involved in swimming.

Those millions of women who are at this very moment suffering from nervous prostration would be astonished at the wonderful toning effects of water, sun and air on the skin while swimming. Sun bathing is one of the pleasures of the art of swimming.

We must not forget the great benefits to the toes and feet derived not only from walking on the wet sand but from swimming, as it helps greatly to form the toes to their natural beauty as, for the time being at least, the shoe pressure is taken off.

Who is there in the shape of a man who would not desire with all his heart to be born of a robust mother? Then we should all do our best to encourage women to be robust and the very best way of attaining that is by swimming. Of course, the European women who work in the fields are robust. But the women of American cities require a means of exercise more invigorating than riding around in cars.

It may seem strange to some that I should warn women and young girls not to swim during menstruation or even on its approach; especially in cold water. It is really dangerous to swim at such times as it checks and interferes with the proper functioning of the body. This, by the way, is the only reason women do not make as successful swimming instructors as men: because there is a period during which they must stay out of the water.

Some authorities say there may be a danger in women acquiring too much muscle, especially in the lower abdominal section as they may become hard in that section, thus making it difficult to relax at childbirth. But in my opinion this hard, unrelaxing type of muscle is the result, almost entirely, of incorrect eating. A muscle may be large and earthy, or large and flexible according to the food we eat. A person eating bread, tea, meat and biscuits to the

exclusion of fruit and vegetables, will develop hard, unyielding muscles. Therefore, it might be a wise plan for a woman who is too narrow in the hips or one who is too tight about the pelvic joints to practise the frog kick on back rather than to put in too much time on the flutter or crawl kick. This action will keep the pelvic joints flexible enough for easy functioning.

XII. LIFE SAVING DRILL

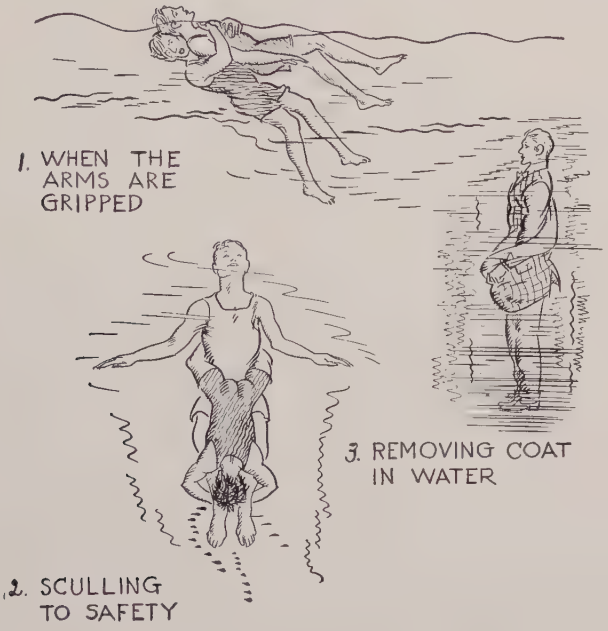
Far too much complex nonsense has been fixed into life saving drills, making them a most elaborate affair. I intend to make the drill in the order of the real event, as an eventuality might really happen.

1. Learn to swim in a suit of heavy, old clothes. In swimming fully dressed, swim slowly and on the back by the broad-stroke-on-back. (See description of this stroke.)

2. Learn to plunge from the surface to a depth of ten feet. To dive from the surface, lie flat on the top in water anywhere from five to ten feet in depth; take a full breath; keep hands flat open at sides and strike the water a downward blow, while, at the same time, turn the head down and bend the spine from the top downwards and from the bottom upwards; also, at the same time, throw both feet high in the air with the knees stiff. Then, if water is very deep, swim down. (See illustration of the Porpoise.)

3. Learn to break away from any clutch that a stronger person may secure on you in the water. Breaking away from the grasp of a drowning person in the water is much less difficult than such a break would be on land. Now, of the many hundreds of persons whom I have pulled out of the water, not one attempted to grasp me by the regulation methods as described by life saving societies; and the regulation breaks are not practical for releasing one's self from the tight hold that the non-swimmers endeavour to fasten on their would-be rescuers. By far the most effective defence that a swimmer can put up against the insane—for all drowning persons are temporarily insane—actions of a drowning person attempting to drown his rescuer, is: draw up the legs so that the knees of the swimmer are under his or her own chin while the feet are placed against the body of the person who would clutch and seriously interfere with the rescuer. Do not kick the subject, but give a powerful push with the large leg muscles which will not only separate one from the clutch but will very likely turn the subject around so that the subject's back is to the rescuer, thus enabling the swimmer to

secure a favourable rear hold for the successful rescue. (See illustration.) The non-swimmer grasps the clothing, then starts to pull in towards his rescuer, winding his arms and legs around the neck and body of the rescuer like a boa constrictor, and then starts to



Saving Life

1. When a drowning person grips his rescuer around the body from behind in such a manner that he cannot possibly release himself, the rescuer can very easily manipulate himself over the other, and shove him under by sculling over him. The rescuer is usually gripped like a maniac who, however, does not know up from down. He simply grips and grips, and the rescuer must act so as to prevent a double drowning.

2. Here the rescuer is absolutely unable to use his legs and must scull only. Sculling, however, is not at all difficult.

3. In a high dive from a vessel at sea, the coat will very likely be thrown back and will bind the arms in a hammerlock. The coat can be removed by "marching," that is, lie on the back and propel oneself forward, going feet first, by the leg action.

climb out of the water by climbing up the rescuer as if he were a pole fastened to the ground. (See illustration.) The substitution of climbing for swimming is always the fatal mistake of the non-swimmer. To meet this circumstance, the swimmer who would qualify for a life guard at the beaches or large pools, should practise

with another person, permitting him to secure any hold but the rear strangle hold, and quietly submerge—after taking in a big breath of air—and endeavour to release the finger clutch of the one acting the part of the rescued. When the finger clutch is released, then swing the person around so that you are behind him. A person in the water may be swung around very much easier than in wrestling on land, as the subject in the water weighs very little or nothing and cannot put weight pressure to bear on the rescuer. But the hand grasp of one drowning is like a maniac's for strength; so that in case one could not release from the "death" grasp at all, the very great benefit of the rhythmic breathing drill would come in handy.

4. Have the class paired off, one of the pair standing directly

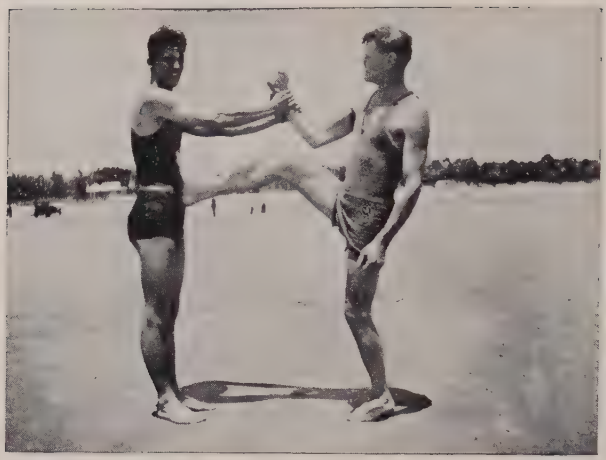
To Keep from Being Seized

There is no more effective protection from being grasped by a drowning person than by placing the feet against him as shown above. The rescuer could even spin him around and then grasp him by various holds from the rear.

behind the other. The rear person will grasp around the arms and the body of the one in front, so fixing the one in front that he cannot free or move his arms. Next, the rear person will wind his legs around the body of the one in front, take in a deep breath, and shut his mouth. This drill should be done in water about five feet deep. The person who is grasped will simply throw the grasper on the back and swim over the top of him; the swimming being done by the up-and-down flutter kick and a sculling wrist movement. (See illustration.) The person underneath must in no case act as an expert swimmer, but must simply retain the clutch with arms and legs as long as he can hold his breath, and then leave go. On the under person leaving go, the rescuer then grasps him by a double rear hold (see illustration) and swims by the frog kick leg

LIFE DRILL

Life Drill class practising different breaks on the wharf before going into the water. A break away should be effected much quicker in the water than on land, as the rescuer is wet and he has the very great advantage in the water of being able to use all four limbs in effecting a release.



RELEASE METHOD IN CASE OF A DOUBLE-HANDED WRIST GRIP

RELEASE FROM FRONT GRIP

Draw head well down, mud-turtle fashion; spread elbows; dig thumbs into the subject's short ribs.

action only, the rescued one being then on top, held firmly on the chest of the rescuer. This method is known as method 3 in the Royal Life Saving Handbook; and is the safest method known.

5. Learn the frog kick correctly by having the class enter water

Release Method in Case of a Rear Strangle Hold

Catch hold of one finger of each hand, being sure to catch the upper and lower grip with your upper and lower hand, and thus be able to swing around into a facing position without being entangled. Practise this release and you will understand it.

about two feet deep, lie on the back and place both elbows and fore-arms on the bottom and practise the proper frog kick. (See illustration and description of the frog kick.)

6. Practise swimming on the back by the frog kick while holding both hands up out of the water above the hips.

RELEASE FROM REAR GRIP AROUND BODY AND ARMS

Press the subject's head well back down into the water and scull over the top of him. As the arms slip up towards the throat, if they do, then quickly grip both wrists and slip out; otherwise, scull over the subject until he is unconscious. A drowning person has a habit generally of winding legs and arms around the rescuer.

TOWING

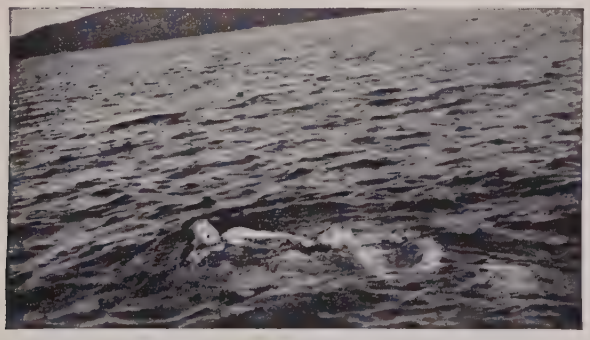
Towing a non-swimmer by the double rear hold so that he cannot turn on his rescuer, though he can grasp the rescuer's hands and hold him.

7. Practise swimming on back by the frog kick holding both arms out of the water.

FACING THE RESCUED IS DANGEROUS

To face the rescued is positively a dangerous method of rescuing a person in trouble. I never recommend it.

8. Practise swimming on the back, using the frog kick, while towing a subject of light specific gravity, the grasp to be secured



RESCUER TOWING BY THE FROG KICK

Here, the rescuer is towing by the frog kick, holding the face high out of the water. The hold which grips both arms close up to the elbows is still harder. It is impossible for a struggling person to grip his rescuer when held by the arms akimbo.

by placing the fore-arms under the armpits of subject towed, while the hands are held firmly and flat on the chest of the subject.

9. Same as for 8, but using a person of heavy specific gravity. Be sure and exhale through the nose as the kick is delivered and inhale through the mouth on the interval between the kicks. I was going to say, inhale on the drift, but there will be very little drift, and the frog kick must be delivered much more quickly and

SUBJECT CANNOT GRIP RESCUER

A perfectly safe method of rescuing a person is by the rear hold, grasping arms above the elbows, so that, if you find you are not strong enough to effect a rescue, you may escape with your own life, avoiding a double drowning.

more snappily than otherwise, or the towed one's feet will sink to the perpendicular and a failure to tow will be recorded against the rescuer. When I tow a person of unusual specific gravity, every now and then I hit him a sharp kick with my knee in the small of the back or at the end of the spine, which causes his legs not only

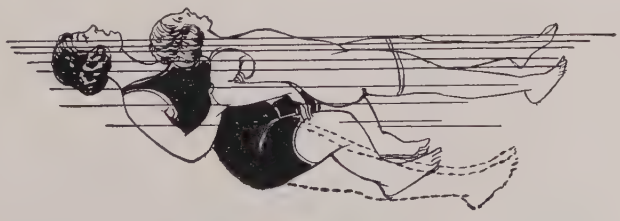
to rise but to straighten out. In the case of a person who is crooked, crumpled up, or who assumes a sitting posture in the water, it is almost impossible to tow.

Rescue Work not Effective by Side Stroke

Effecting a rescue by using the side stroke and grasping the subject by the hair may be effective for a short distance only but should not be the method used by trained life guards.

10. Repeat the last, but with both subject and rescuer fully dressed in old clothes.

11. Have the subject swim to the depth of eight to ten feet



Rescue Work with the Frog Kick Back Stroke

This is the safest method of rescuing, as the rescued cannot possibly grasp the resucer. The rescued, being held firmly by the arms just above the elbows, cannot grasp the hands and wrists of the rescuer as is possible when the rescuer's hands are clasped over the chest. The rescuer should breathe every stroke. Should the rescued bend, the rescuer should use the knee to kick the rescued just about the small of the back in order to prevent bending. It is extremely difficult to tow a person whose body is bent.

and lie there, the rescuer to follow immediately and secure a rear hold, place both feet on the bottom and spring up from the bottom. This idea of springing from the bottom must always be taken ad-

vantage of. Remember that the easiest method is the most correct method always.

12. Practise sculling on back until 100 yds. can be covered by using the hands only.

Rescue Work with Shepherd's Crook

The shepherd's crook is the most effective instrument with which to pull a drowning person out of the water. Any old man or woman can easily use it in transparent water. If a clumsy person sinks to the bottom a life belt cannot reach him but the shepherd's crook can. It can be even twenty feet long. Twelve men saw another drown in the bottom of an indoor pool; none would rescue him. If a shepherd's crook had been hanging on the wall, as it should always be, no accident would have happened. Each indoor pool should have two shepherd's crooks, one on each side.

13. Learn the Shafer method of resuscitation. It is so very simple that a child could learn it thoroughly after one or two minutes' instruction.

14. Reverse the drills and have the other person take the place of the rescuer.

THE SHAFER METHOD OF RESUSCITATION

Press steadily with the heels of the hands over the floating ribs; then relax with a snap. Time, from 12 to 15 times a minute.

A VERY GOOD METHOD OF RESUSCITATING A DROWNED PERSON

Press with both hands, then catch the subject's right arm with the operator's right hand. Pull the arm well up and back to get the air into the lungs. Repeat about as often as in the Shafer Method.

The Shafer method of resuscitation is explained in the illustrations. From my experience I would say on no account relinquish

the Shafer method of resuscitation in favour of any machine that some official has brought upon the scene; I have very much more faith in the prone pressure method, than in any machine action on the lungs, as a power for resuscitation from asphyxiation from coal gas, smoke, ammonia fumes, war gas, sewer gas, or drowning.

When failure to bring the person back to consciousness seems inevitable, it would be well to turn him over on his right side, that

SHAFER RESUSCITATION DRILL BY RED CROSS PUPILS UNDER CAPTAIN MILLS

The pressure is steady, while the release is made with a jerk and without taking the hands off the subject. From 12 to 15 times per minute is about the proper time for alternate pressure and relaxation. This method may be learned in one minute and is far superior to the use of air pressure and suction instruments.

is, the left side will be uppermost; then give him a smart slap directly over the region of the heart. This should always be done before abandoning the effort to bring the person to, as it has a powerful tendency to start the heart functioning. As soon as life appears, promote circulation and warmth by friction of the limbs, rubbing toward the heart. I think as many if not more persons die from chilling than from strangulation. Always be sure to aid the body to recover its normal heat by the application of hot cloths

and hot water bottles, also, as soon as breathing occurs, as many relapse after being brought to.

To be thorough in life saving it would be well to qualify in both the Royal Life Saving Society's awards and in the American Red Cross' awards. The R.L.S.S. Handbook may be procured from 8 Bailey Street, London, E.C. Read it through carefully.

XIII. STUNTS AND FANCY SWIMMING

A professional glass tank performer may pick up a hundred dimes with his tongue from the bottom of a glass tank or he may lie down and go to sleep or sew or drink milk or eat bananas or smoke, but these are so ridiculously easy as not to be worth while mentioning. We will pass over such as mere injurious breath holding feats not properly belonging to the art of swimming.

Sculling Feats

Swimming in a Wash Tub: Lie on back on surface, draw knees up to chin and, in this position, by a very rapid sculling motion in which the water is rapidly pushed to one side, spin around in a circle about the size of a wash tub.

Sculling with Both Feet High out of the Water: Lie on back; draw knees almost up to the chin and keep both legs from knees to feet straight up out of the water while sculling powerfully, head first. A very difficult feat, but it can be done, though it is far harder than to scull with both legs cramped, but in the water.

The Propeller: Lie on back, bring hands back of and under the head while keeping them in the water on the move from sides to underneath head. If the toes stick out of the water, that is, if the person is able to assume the horizontal float, then scull, feet first, rapidly. Keep the eyes open and breathe freely in through the mouth and out through the nose.

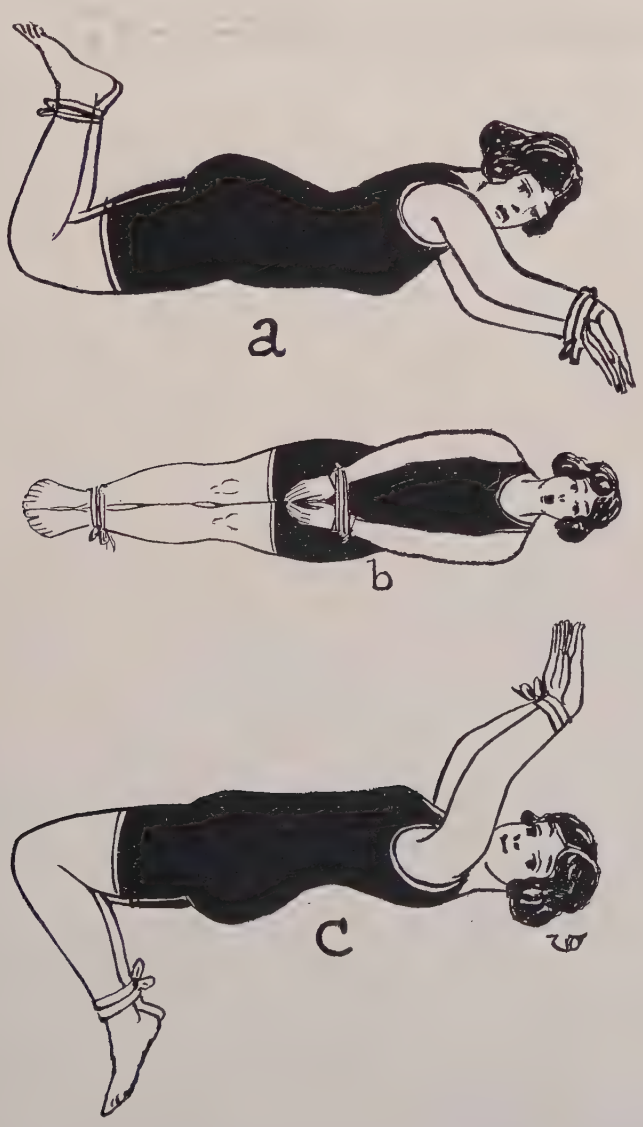
Propeller people cannot perform the torpedo, and vice versa.

The Torpedo: If subject cannot assume a horizontal float because the legs are so muscular that they sink, then he may do what the propeller swimmers cannot do, viz., sink the head and chest and by holding the breath *scull feet first.* (See illustrations.)

Sculling Feet first on Back: Lie on back, scull with fingers pointed down and hands more under the hips than at the sides. (See illustrations, sculling head first and feet first.)

Animal and Fish Imitations

The Muskrat: Come up quietly to the surface from underneath and scull head first on front very quietly, turning here and there while keeping the legs straight out behind, together, not moving



Swimming with Hands and Feet Tied, Seen from Above

them, as they must resemble the muskrat's tail. Then suddenly dive and disappear.

The Otter: Come up unexpectedly from underneath and, by a

The Double Somersault

Both turn forward simultaneously, always retaining hold of hands. Hands should be held by closed fingers only.

sculling action of the hands, swim as in the muskrat, but undulate and roll alternately. The legs must not be moved as they must resemble the otter's tail. The hands take the place of the otter's

The Propeller and the Torpedo

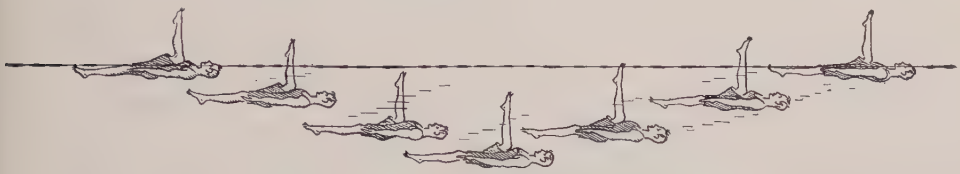
Upper cut: The Propeller.
Lower cut: The Torpedo.

The propeller cannot be performed by anyone whose feet will not float, but such a person can do the torpedo which is a breath holding stunt.

Both the propeller and the torpedo are performed by a very rapid sculling action, under and back of the head, thus propelling the person feet first with considerable rapidity. Keep the hands deep and don't let them come to the surface. The action is by hands, wrists, forearms and shoulders. The torpedo may drive the water up the nose.

hind feet as that animal seldom uses his front feet, merely folding them on his breast. Everything must be done without a sound. The otter resembles the "porpoise" except that it comes up very

quietly and not with a bounce; hence there is no need of diving up to the surface as in the porpoise.



The Submarine

Some water stunts are very hard to learn but once they are acquired they are very easy to perform. The Submarine is always very hard to do. Draw the knee well up so that the foot will be almost over the face; then take a huge breath and scull head first for a few yards; suddenly submerge by a reverse sculling action, having the hands facing upwards so as to pull the body under. Scull along under water for several yards while keeping the eyes open, looking upwards. Let the air out of the lungs suddenly (Fig. 6) through the nose; take in a deep breath (Fig. 7) and repeat, disappearing and reappearing a half dozen times at least.

Imitating a Porpoise

The principal feature of this stunt is diving down to the bottom, springing from the bottom up to the surface, and diving immediately to the bottom again. The only pause is at Fig. 5. Air must be taken in at Figs. 1 and 6; held at Figs. 2, 3, 7 and 8, and let out at Figs. 4 and 5. Be sure to finish exhaling at Fig. 5 so that the lungs are empty at Fig. 6, when the mouth is opened and a great inrush of air is gulped into the lungs. The mouth should be shut at every figure except 6. The eyes should be open all the time. At Fig. 4, proceed head first by sculling, without moving the legs; the distance at this figure should be extended as long as possible so that the stunt will look more like the real sea-pig. A grunt emitted while taking in air at the surface would make it still more realistic. Figure 7 should occur a dozen times in doing the stunt.

The Porpoise: See the illustration, as the only way to learn it is by following the advice in the drawings. The novice will make

the distance between the surface appearances too close together but by practice much greater distances apart can be performed. The legs in the porpoise must not give scissors nor frog kick, but may or may not flutter on the under water swimming. The porpoise is the most graceful of all water feats; it looks best in opaque water.

THE TANDEM CRAWL

This explains itself. The anchor girl has the hardest work of course. It is also her duty to keep time with the forward girl. Make the arm movement as beautiful and as slow as possible. This is not a hard feat for buoyant girls to do but it is very hard for men whose specific gravity is great.

The Dolphin: This is the same as the porpoise except for the backward curve and a loop-the-loop movement as in the wheel. Alternating the porpoise and dolphin is most spectacular.

The Crab: Swim sideways on front by an overlapping movement of the arms and legs.

A second and very much more difficult method of imitating the

TANDEM BACK CRAWL

Could be extended to a dozen girls.

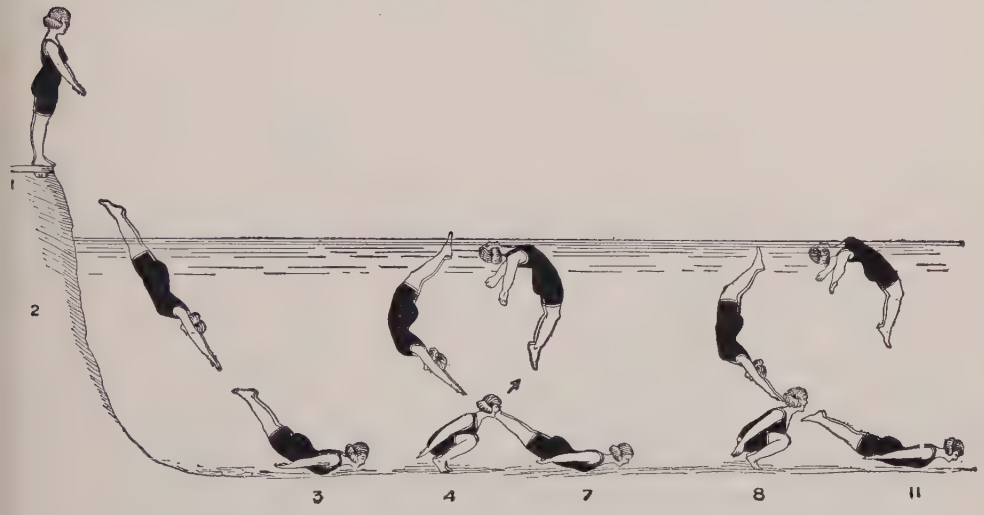
crab is to lie on the back on the surface of very clear water, then blow all the air out of the lungs and sink to the bottom and walk on hands and feet upside down with the back arched. About one swimmer in a million can do this feat, as it is even harder than the rolling torpedo.

The Bluegill: Lie on side, extend one hand straight in front

on the surface and the other hand straight behind. Swim with the scissors kick while slapping the surface of the water with both hands. This is a hard feat for a man who has very heavy specific gravity but an easy one for a woman who has very light specific gravity.

The Bicycle

Lie on either side and draw the knees towards the chin, and run around yourself by an alternate leg action as if peddling a



The Dolphin

The Dolphin is a form of loop-the-loops in the water like the "Wheel" but progressive like the "Porpoise." Make the distances as far apart as possible by a rapid sculling movement with the hands. Take in air through the mouth at 1. Hold the air at 2. Start blowing the air out through the nose at 3 and finish exhaling at 4. Take in new air through the mouth at 5. Hold the air at 6. Start blowing the air out at 7. Finish exhaling at 8, and so on.

bicycle. By reversing, one can go backwards. The underarm may work unseen and help whirl the body around. The upper hand is stretched out as if holding the handle of a bicycle. From the marching stunt one can swing into the bicycle stunt easily.

The Churn

Roll up into a ball on the surface by drawing the knees close up to the chin and holding them there, then spread the hands wide

apart and by a very rapid hand action strike the water in such a way that you somersault forwards with astonishing rapidity. The backwards somersault would not resemble a churn.

The Wheel

Lie on the surface and arch the head back as if to meet the feet, thus the body is bent to resemble a hoop. Hold this position by

The Wheel

The performer of the Wheel will whirl around with astonishing rapidity, as many as one hundred times, by a rapid arm motion with the arms spread far apart to keep from going unevenly. Catch the breath through the mouth, in very quick time, as the mouth passes about four inches of space. The breath is let out through the nose in a steady stream, in the space of four feet of the whirl. This is good breathing practice. The Wheel is practically the same thing as the loop-the-loop and the dolphin, the last stunt being performed by a spring from the ground.

making a very rapid short strike with the hands held wide apart and whirl around by the same movements as for the churn. Hold the hands wide apart so as not to go crooked. This is not a breath-holding stunt as the churn is; the breath is grasped as the mouth passes the surface in the fraction of a second, the air flowing out in in a steady stream through the nose in the rest of the circle. (See illustration).

Waltzing in the Water

Revolve on the crawl three times one way, then reverse and go three the other way without any pause or hesitation in the action. Perform the arm action very slowly and the leg action very fast and continuously.

Crawl Three Style Medley Race

One length by the front crawl, one length by the back crawl, and one length by the revolving crawl makes a far better medley race than the old style of one length on front by any front stroke, one on side by either side underarm or side overarm, and one on back by any back stroke. Contestants must swim in a straight line or lose the race, otherwise the contest would lose its beauty.

Remarks

There are a great many feats that are very interesting from a spectacular standpoint that can neither be illustrated nor described on paper but must be seen to be understood and learned. Therefore, I will not attempt to describe them as it only results in confusion and one need not encumber a work of this kind by attempting such descriptions. Some things can be taught only by observation, never by book.

The craze to pit woman against woman in races during indoor swimming contests is not to be highly commended. On the other hand, I consider a contest in fancy swimming feats will make a meet highly spectacular and quite harmless from the point of heart strain.

Women who float well could also put on a floating exhibition in the form of letters, stars, butterflies, triangles, squares, circles, etc., etc., by holding hands and feet in such positions that their bodies assume these different figures. But there should be no bending or giggling in such work because that makes for failure; the figures call for a quiet drill formation, done quickly and noiselessly except for the directions of the leader or director.

XIV. WATER SPORTS

Water sports are, as a rule, exceedingly interesting to the onlookers. No one needs to ask, do the participants enjoy them? When adults engage in water sports, for the time they enjoy return to childhood. The quiet play of Indian and Asiatic children is a positive evidence to me that they do not enjoy existence nearly as much as the children of the Anglo-Saxon races. The loud shouting and absolute forgetfulness of all manner of worries, and the perfect abandon of everything but play is a very distinctive feature of the Anglo-Saxon at play. While at play, whether in or out of the water, there is nothing serious to interfere with utter abandon and thus is play a tremendous factor in preventing diseases of the brain. But lunatics won't play; if they would play they would not be crazy. Water sports would have a tremendous power in preventing insanity. Here I will say to mothers and fathers: Take an interest in your children's play and encourage it all you possibly can, as play has a tremendous power to keep the boys pure in thought and it enables them to pass from boyhood to manhood in such a smooth manner that powerful manhood is attained, and not weakness. Play induces sleep and normal sleep at that, free from weakening dreams.

Water sports cannot be indulged in with any degree of joy when the water is cold, or even cool.

In a carnival, tournament, or water gala, short snappy events are the most relished by the onlookers, and it is the pleasure that the players give the onlookers that still further helps the players to enjoy it.

Relay Race

Five teams can easily race in a pool 35 feet wide, and two teams in a pool 18 feet wide. Relay races should always be two lengths of a pool, as no one who cannot swim up and down a pool at top speed should be considered eligible to qualify in a team; the clumsy dub always takes the joy and interest out of the entire affair by slowing up on the return. The captains have their team picked

always, if they are alert men, and make a business of knowing who is who in their club. The teams may be chosen by the selected captains or they may be rival clubs meeting for an all-round contest. The relay race between two outside clubs generally gives the winning team five points and the losing team no points. But this is always settled before the contest.

Whether it is wise to put the slowest man first, or to put a good, fast man first, and try to discourage the other team, the wise captain will decide considering circumstances. The more you try to discourage some men the more they clench their jaws and fight defeat.

Relay races are splendid for finding out who is a slow dub and who is a really fast swimmer; and relay races should be used every day by all swimming clubs. Four men may form a team, or ten; it matters little unless it is an intercollegiate swimming meet.

Caution should be observed by all the contestants to swim straight, as the crooked swimmer will lose the race, even if ahead, as no one must make a foul in the other's water space. Every advantage should be taken of the racer's plunge and racer's turn. Very spectacular is a relay race in the water where two or more teams arrive at the finish only inches apart.

Handicap Races

In my opinion handicap swimming races are positively stupid as the spectators cannot understand them. I propose, instead of having the handicap race, to have class races: thus, those who swim 100 yards in 60 seconds or less be entered as class A men; those who swim 100 yards in 65 seconds or over 60 seconds be entered as class B men; those who swim the distance under 70 seconds and not as fast as 65 seconds be entered as class C men; those who swim it in between 70 and 80 seconds be D men, or women, as the case may be; and all slower than 80, be class E.

Thus we would have far better races and the official timer would be called the classifier instead of the handicapper. I never saw a handicap race in my life that I enjoyed, and the comments of the audience are always of a sarcastic nature. By this classified method everyone will strive to rise a class.

Hurry-Skurry Race

Fifty yards from the water's edge is a line of canoes held in leash with the bows pointing in. Fifty yards from the water's edge, on land, the contestants line up in the order of the canoes facing them. At the word "go," the contestants run to the water's edge, swim to the respective canoes, jump in and paddle to shore.

Obstacle Race

Generally, this is a short race of 100 to 150 feet in length with various obstacles placed in the way, such as a scow either to climb on to and run over, or to swim under; then a hoop or hoops tied to a fixture; a pole to reach and climb over, and perhaps a barrel to go through before reaching the finish line.

Old Clothes Race

To swim a short distance to a wharf or scow and put on a suit of old clothes and swim back in the old clothes, fully dressed, is the general rule of this race. Sometimes the old clothes for all the swimmers are well mixed up in a pile and each contestant must find his own particular suit.

Life Saving Race

Contestants line up in the water in pairs and, swimming with the double hold on back, using the frog kick, tow his or her team mate to the other end of the pool; on arriving there an immediate change of positions takes place and the other person tows back to the finish.

Sea Serpent Race

Only buoyant girls can very well engage in this race as the deep sinker is terribly handicapped to manage it. The girls line up in a row, one behind the other; the first girl gets down and grips the girl behind her with her legs (see tandem crawl) around the waist and the next does the same, and so on down the line. The last, or anchor girl should be a powerful person about the upper thighs as she must put on a terrific leg drive. All the girls must keep perfect arm time with the first girl and use the crawl stroke. The other team is lined up similarly and the two teams swim one length of the pool, starting from the shallow end.

Tandem Race

See tandem crawl illustration for explanation.

Catch a Live Duck

Liberate a wing clipped wild duck in a swimming pool and catch it inside of one minute; only one person at a time to try.

Water Base Ball

This game has not taken, and, as far as I can see, has been discarded.

Pick-a-back Wrestling

This is best managed in water not quite up to the shoulders. The wrestler or rider mounts upon the shoulders of the "horse," winds his legs under the armpits of his "horse" and places his feet on the lower back section of the man under. The upper men of course do the wrestling as the lower man must wind both of his arms around the rider's legs and hold them firmly. But the "horse" must use a lot of good judgment in approaching his opponent and in retreating and side-stepping. If there's plenty of space, several pairs may be wrestling at once. The object of a contestant is to unhorse the rider of his opponent; and only the upper man must grasp, push and overbalance; even though both horse and rider may be toppled over and ducked, they are not defeated until unhorsed. It is kept up until the only undefeated pair have no remaining opponents to conquer, for as soon as a pair are unhorsed they retire from the field. It is tremendously interesting sport to both the contestants and to the onlookers, until the next day when the "horses" experience a pain in the back of the neck that makes them hesitate before indulging again in such strenuous neck wrenching. Only bull-necked men can stand the strain long.

Tom-Tom-Pull-Away

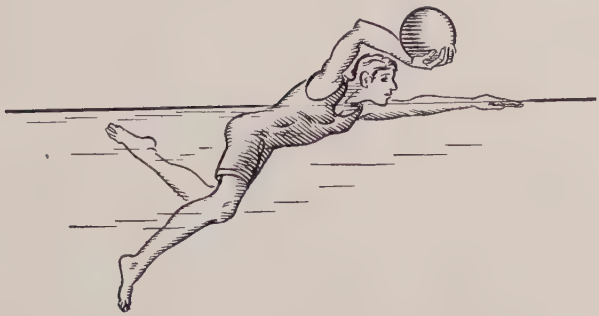
This game requires a width of 35 feet; the water must be opaque and the game played at the deep end of the pool. Some one volunteers to start the game by getting in the middle of the pool

and calling out "all ready." When these words are pronounced, all must at once dive into the water and get across without being captured. In capturing a player, it is not at all necessary to smother, or strangle the person captured, but simply to hold by leg, arm or shoulder and so impede the player that he or she cannot swim to the other side. On touching the other side, the player is free to clamber out and go in for the next dive across. As soon as a player is captured he must immediately assist in capturing others, even before the next call out of "all ready" is cried. Those in the pool calling out "all ready" must line up at the exact centre; those hesitating to plunge on the call may be approached and dragged in if they refuse to plunge. It is great fun as there are so many tricks of getting across that it makes the contest exceedingly lively. The last man to be captured wins the game, of course. One trick I used to play was to dive down perpendicularly and close to the edge of the pool, then I would swing over on my back and swim by the old breast-stroke-upside-down across the pool; thus I could see up better than others could see down and when a player did reach down to grab me I would place a foot against his chest and push him away; being close to the bottom of the pool I had the leverage on him; of course, finally I would be caught. Dark water makes this game exceedingly interesting as there is mystery in the dark.

Water Polo

The old game of water rugby has disappeared, as well it may, as it was only a ducking game, with little or no skill required from a play sense; quickness in handling the ball was entirely absent, as the ball was partly deflated and could be grasped and held easily, and having no bounce or life in it, could, if thrown, be very easily stopped.

But, on the other hand, water soccer (Soccer by the way is derived from the Scotch calling: "Sock her, Jock") has come to stay and I give the rules for the same as played at the Olympic Games. In Canada, the various swimming clubs and universities use the same rules except that the goal bar is only 2½ feet above the water line and only 6 feet wide instead of 9 feet, as in Europe. This makes it very much easier for the goal keeper and more difficult for the forwards. In my opinion a 9-foot goal is a terrible width for a single goal keeper to guard.



To throw the water polo ball back hand is a quick, tricky feat that very often takes the goal keeper by surprise as the thrower is facing away from the goal. It requires some practice. While some catch on to the knack quickly, others never acquire this throw with force sufficient to carry well. Powerful triceps muscles are necessary to give power and snap to the throw.

The round arm throw while not as accurate as the overarm throw, nor as easy, has surprising carrying force when one's pectoralis major muscles are strong and supple. Press the forward hand down and make a very strong scissors kick so as to rise high in the water when throwing the ball with either overarm or round arm throws.

Water Polo

The back hand throw is an easy method for the beginner to learn to throw the hard, inflated water polo ball. On reaching the ball, the player can slip over on his back and toss it through the goal by this throw.

I am rather inclined to consider the trudgeon stroke much more adaptable for use in playing water polo than the crawl stroke, as the scissors kick enables the player to make a terrific long throw, a throw that is hard to stop; also the trudge swimmer can start better from a still position in deep water, as there is more spring in the scissors than there is in the crawl kick.

Water polo should always be played on an empty stomach and in a well-ventilated room. Smoking should be absolutely prohibited in a swimming pool, as the combination of steam and tobacco smoke is a nauseating stench; and the condition that swimmers breathe in through the mouth and not through the nose will result in even smokers becoming ill after participating in a game of water polo where smoking is permitted; in this case the three or four poisonous elements in tobacco smoke affect the players as the German gas did our soldiers.

See illustrations as to how to throw the ball. It requires considerable practice in order to throw the full inflated ball with force and skill. My advice to forwards is to keep always well forward in your proper places and as close to the goal as the rules permit.

Water polo is a game for men with hearts of the grizzly bear. I was going to say lion-hearted men, but a lion hasn't nearly as strong a heart as a grizzly bear, and the men who play water polo are really playing the most strenuous game yet invented by man.

Olympic Water Polo Rules, 1908

1. *Ball:* Round and fully inflated; not less than 65 centimetres nor more than 70 centimetres in circumference; waterproof, smooth and free from any sticky matter.

2. *Goals:* Width, 3 metres; height, 90 centimetres.

3. *Uniform:* One team to wear dark blue caps, the other to wear white caps; both goal keepers to wear red caps.

4. *Flags:* Each goal scorer to be provided with a red flag; the referee with a blue flag, a white flag and a bell.

5. *Field:* Length, not more than 27 metres nor less than 25 metres; width, not more than 16 metres; the halfway line and the 3 metres 66 centimetres penalty lines to be marked on each side.

6. *Time:* Duration of play to be 7 minutes each way; time taken up in disputes, etc., to be deducted, so that 14 minutes' *actual playing* be the allotment. At half-time three minutes are allowed. When the ball is out of play for any reason whatever, that time must be deducted from the seven minutes.

7. *Referee:* His duties shall be to start the game, stop all unfair play, decide all cases of dispute, declare fouls, goals, half-time, and time. His decision is final, but he may change his decision if he does so before the ball is again in play.

8. *Goal Scorers:* They shall stand at the side near each goal, to declare, by waving a red flag, when a goal has been scored at their end. They shall not change ends at half-time. They signal to the referee and each is responsible for his own end and for nothing else.

9. *Teams:* Seven men on a side; one goal keeper; centre, right, and left forward; centre, right and left backs. No player is permitted to oil the body.

10. *Captains:* The captains shall toss for choice of ends.

11. *Starting:* Players line up at each goal line in the water. The referee should stand in line with the exact centre of the field. The Captains signal that they are ready. The referee calls "Go," and then throws the ball into the exact centre of the field. The ball must be handled by more than one player before a goal can be scored.

12. *Scoring:* The entire ball must pass under the crossbar before a goal is scored.

13. *Ordinary Fouls:* (a) To touch ball with both hands at the same time.

(b) To hold the rail or side during any part of the game.

(c) To stand on or touch the bottom during any part of the play, excepting to rest when the ball is not near.

(d) To interfere with or impede an opponent in any way, unless he is holding the ball.

(e) To hold the ball under the water when tackled.

(f) To jump from the bottom or push off from the side (except at starting or re-starting) in order to play the ball or duck an opponent.

(g) To hold, pull back, or push off from an opponent.

(h) To turn on the back and kick at an opponent.

(i) To assist a player at the start or re-start.

(j) For the goal keeper to go more than four yards from his own goal line.

(k) To throw the ball at the goal keeper from a free throw.

(l) To refuse to play the ball at the command of the referee, after a foul, or after the ball has been out of the field of play.

Note: Dribbling, or striking the ball, is not holding; but lifting, pressing under water, or placing the hand over or under the ball, when actually touching, is holding. Dribbling the ball up and through the posts is permissible.

14. *Wilful Fouls:* (a) To start before the word "Go."

(b) To deliberately waste time.

(c) To take up a position within two yards of an opponent's goal.

(d) To deliberately change position after the whistle has blown, with a view to taking advantage of an opponent.

(e) To deliberately splash in the face of an opponent.

Penalty: To be ordered out of the water until a goal has been scored; and not to be permitted to enter at half-time if no goal has been scored, and if a goal has been scored, only by permission of the referee. On a player's refusal to leave the water at command of the referee, the referee shall stop the game and award the decision to the other side.

15. *Free Throws:* A free throw is given to the nearest opposing player from the place where the foul was committed. The thrower may throw, not for the goal, but to one of his own side.

16. *Penalty Throw:* A player, wilfully fouled when within four yards of his opponents' goal line, shall be awarded a free throw for goal. This may be taken from any point on the four-yard line.

17. *Declaring Fouls:* On a foul being proclaimed by the referee, he shall wave the flag of the colour that the free throw is awarded to. Should a member of each team commit a foul about the same time the referee shall order the ball out of the water and throw it between the offending members. The ball must first touch the water before it is in play.

18. *Goal Keeper:* The goal keeper may stand to defend his goal, and must not throw the ball beyond half-distance. The penalty for doing so shall be a free throw to the opposing side from half-distance at either side of the field of play. The goal keeper is exempt from clauses (a), (c) and (f) in Rule 13, but he may be treated as any other player when in possession of the ball. Should the goal keeper be ordered

out of the water for a wilful foul, the man taking up the position as goal keeper shall do so as an ordinary player, but at half-time a player can be officially appointed as goal keeper. Unless a goal keeper is injured another player cannot be appointed until half-time.

19. *Goal and Corner Throws:* A player, throwing a ball over his own goal line, shall concede a free corner throw to his opponents, and such shall be taken by the player on the opposing side nearest the point where the ball leaves the field. The goal keeper has a free throw in every case where the ball passes his goal line, but, if he should permit the ball to drift or pass under the crossbar by his own carelessness in handling, then a corner throw shall be awarded the other side.

20. *Out of Play:* The player who throws the ball out of the boundary line must concede a free throw to the other team from where it left the field of play at the side. Should the ball strike an obstruction overhead, and again bound back, it is in play, but should it lodge there, the referee will return it to the water immediately under where it lodged.

21. *Declaring goals, Times, Etc.:* The referee shall declare fouls, half-time and time, by whistle; goals by bell. The time-keeper may notify time and half-time by whistle.

22. *Leaving the Water:* A player, leaving the water, or sitting, or standing on the steps, or sitting on the side of the pool, excepting at half-time, or by permission of the referee, shall not re-enter until a goal has been scored, or until half-time. Should a player leave the water he can re-enter only at his own goal line. If any player leaves the water during the progress of the game, without permission of the referee (except in case of illness or accident) or refuses to enter the water at the request of the referee, the team to which such player belongs shall be deemed to have lost the game.

Besides the difference in the size of the goals, for comparison between the Canadian game of Water Polo and the European game, I append the following:

Extracts from the Rules of Play of the Canadian Aquatic Polo Association

Rule 5. The duration of the match shall be 20 minutes, 4 quarters of 5 minutes each, 10 minutes to be allowed at half time for rest. No intermission to be allowed between 1st and 2nd, and 3rd and 4th quarters. . . . When a goal has been scored the time to the re-starting of the game or the time occupied by disputes or fouls shall not be reckoned as in the time of play.

Rule 6. The officials shall consist of a referee, judge of play, two timekeepers, and two umpires.

Rule 10. Each team shall consist of eight players. There shall be not more than six players of each team in the water at one time. A player may be relieved at any time that the ball is not in actual play. The player being relieved must swim back to his own goal-line before leaving the water. The player relieving him must start from behind his own goal-line. (This rule is adapted to C.I.S.A. play).

Rule 12. . . . A goal shall not be scored after starting or re-starting until the ball has been touched by at least two players of the opposing team other than the goal-keeper.

Rule 13. A goal should be scored by the entire ball passing between the goal posts and under the cross-bar, and can only be scored by a player in a swimming position.

Rule 13B. A goal can be scored only by a submarine player on the surface of the water from outside the goal crease.

Rule 14. It shall be a foul:

(a) To hold the rail or boundry at any part of the game.

(b) To duck an opponent unless he is holding the ball.

(c) To hold, pull back, or push off from an opponent who is not in possession of the ball.

(d) To turn on the back and kick an opponent.

(e) To assist a player to start or re-start.

(f) To touch the ball with two hands (goal keeper excepted).

(g) Not more than one player shall be allowed to tackle or check a man.

(h) All penalties to run into overtime play when such overtime periods are necessary to decide a game.

(i) A penalty of two minutes will be given to a player who interferes with an opponent in securing the ball when it looks as if he would score if not impeded. This relates to pulling back and otherwise interfering when he is not in possession of the ball.

(j) A penalty of one minute will be given to a goal keeper who jumps off from the back of his goal to stop a score being made.

Rule 15. The penalty for each foul shall be a free throw to the opposing side from the place where the foul occurred. A goal cannot be scored from a free throw unless the ball has been handled by at least one other player of the side having the free throw.

Rule 16. If, in the opinion of the referee, a player commits an ordinary foul *wilfully,* he shall order him out of the water for from one to three minutes, or for the remainder of the game, at his discretion. It shall be a foul to deliberately waste time, or for a player to take up a position within 4 feet of his opponent's goal.

Rule 17. The referee shall declare a foul by blowing a whistle or other signal agreed upon. . . . The other players shall remain in their respective positions from the time of signal to stop, until that given to start. In the event of a man having a free throw not throwing after the whistle is blown, the ball shall be considered in play. The ball when thrown up by the referee shall touch the water before being in play.

Rule 18. A player throwing the ball over his own goal-line shall concede a free corner throw to his opponent, but if the attacking side throws the ball over, it shall be a free throw for their opponent's goal-keeper, when he shall immediately put the ball into play upon reaching the goal-line.

Rule 19. (a) The goal-keeper must have both hands free when playing the ball. He shall not throw it more than half the length of the pool, nor shall he advance more than six feet in front of the goal, nor shall he push off from the boundary at the back of the goal.

(b) Both goal-keepers to wear red caps.

Rule 20. Should a player throw the ball out of the field of play at either side, it shall be thrown in any direction from the place where it went out, and shall be considered a free throw.

Rule 22. Any player leaving the water or resting without the permission of the referee shall not resume play until he has returned to his own goal-line.

Rule 23. . . . No coaching shall be allowed from the galleries or other points of vantage. In the event of any benefit being derived by either team from such coaching, the referee is empowered to give the ball to *any* member of the opposing team.

Rule 26. . . . A team keeping the opposing team waiting 15 minutes shall be penalized one goal.

Basket Polo and Water Hockey

These games are not popular and I mention them merely to say that they have been tried out.

XV. SWIMMING MEETS

Swimming meets are often injudiciously conducted and the public has become indifferent to them for this reason, not because they lack interest in aquatic contests. A swimming meet should have one manager only, not a half dozen to wrangle and argue about the affair, especially at the last minute, holding up the audience for an hour. This actually has happened.

The manager should select a natatorium that will accommodate an audience in at least fair comfort as to space and ventilation. He should see that the seats are in place in time; that the tickets are put on sale sometime in advance of the event; that ushers will act who can be relied upon to be there; that the doors are open at just the proper time, not too far ahead of the hour set for the event; that one person is appointed whose special duty is to see that there is sufficient ventilation. The air in a natatorium soon becomes overheated and foul. The manager should also decide as to whether only the first man in the preliminary races, or the first and second men, may enter; he should decide as to whether there are to be semi-finals, or not, but this should be done before the day of the meet. He should also arrange the entire program, and, above all, see that the affair starts on the minute. Very many times, it has been my experience at swimming meets (as a spectator) to observe delays for really no practical reason at all, so that it is my opinion it is much better to have only one manager, not three or four, or more, as the case may be. Nearly always, there will be some last minute difference. This generally means that the water polo game, which most of the audience have come to see, is not played at all, to their great disappointment.

If there is to be a plunge for distance, all the contestants should plunge together, making this rather uninteresting feature lively, and at the same time, getting it through quickly.

If there are any delays in the regular program, it is a very good plan to have some skilful amateur at hand to get in the pool and do some difficult, novel, fancy feats in order to prevent the monotony of a delay and to keep up the interest of the audience.

Smoking should be positively prohibited at all swimming meets, indeed, it should be prohibited in the natatorium at all times, as the mixture of tobacco and steam makes a horrible odour. Besides, when this mixture of tobacco and steam is drawn in through the open mouths of the contestants when they are swimming, it causes a very annoying, choking sensation in the lungs that sometimes lasts for days, and is very injurious.

Clocking Races

Sometimes such a large number of entries are made for races, such as the annual interscholastic races, that the committee in charge decides to time the racers and award the prizes to the first four best times made. This does away with heats and semi-finals; it makes each race a final. Here is where the thoughtful and careful coach will advise his students who are entered as contestants to look out for tricks, for managers of such affairs have been known, where there is dislike of an outside city, to place the contestants from such a city with local boys who are ridiculously slow and who really have no business to be in the race whatever. The outside contestant, being a fast swimmer, will slow up when he finds he is not being pushed by his competitors, and will finish the race in slow or outside time, and thus lose out, although he has not exerted himself in the least and is not at all tired. This is what I call "clocking them out."

PROFICIENCY ABILITY TEST TABLE

		POINTS
Sculling, 75 feet, head first		10
Steamboat	5	15
Crawl on back	10	
Side underarm	5	25
English, side or single overarm	10	
Trudgeon	10	
Broad-stroke-on-back	5	10
Double-overarm-on-back	5	
Front Crawl		15
Towing, 75 feet by two arm hold, using the frog kick		10
Towing by one arm hold, using the scissors kick		10
Dive entry into water and surface dive		5
Total percentage		100

Note.—All details of the different strokes must be perfect in order to merit full points; such as assuming the horizontal position,

the correct arm and leg rhythm, and the under-water breathing; the condition of exhaustion or the grace and ease at the finish of a feat. The trial examiner need glance only at the style of the crawl, trudgeon and other strokes to be able to judge thoroughly the point merit deserved by the pupil. There is no necessity whatever of making any stated distance necessary in order to judge the strength of the swimmer, as a certain ragged style or perfect style will deserve such and such points.

Methods of Scoring Dives

There shall be three judges who shall stand at different sections of the pool, and, without consulting each other, award points and half points for each dive, according to the following scale:

Unsuccessful attempt	0
Poor dive	$2\frac{1}{2}$
Fair dive	5
Good dive	$8\frac{1}{2}$
Excellent dive	10

TABLE OF DEGREE OF DIFFICULTY

DIVE	STANDING	RUNNING
1. Forward somersault	1.0	1.0
2. Forward $1\frac{1}{2}$ somersault	1.7	1.7
3. Forward somersault with $\frac{1}{2}$ corkscrew	1.7	1.7
4. Forward $1\frac{1}{2}$ somersault with $\frac{1}{2}$ corkscrew	2.0	2.0
5. Forward double somersault	...	2.0
6. Backward somersault	1.0	...
7. Backward $1\frac{1}{2}$ somersault	2.0	...
8. Backward double somersault	2.0	...
9. Flying Dutchman (forward spring back dive)	1.9	2.0
10. Isander, Comeback, or Flying Dutchman	1.7	1.8
11. Come-back and $\frac{1}{2}$ corkscrew	1.7	1.7
12. Back corkscrew and $1\frac{1}{2}$ somersault	2.0	...
13. Forward spring half corkscrew back dive	1.5	1.6
14. Forward spring full corkscrew with forward dive	1.8	1.8
15. Backward spring and forward dive ($\frac{1}{2}$ corkscrew)	1.0	
16. Backward spring and backward dive (full corkscrew)	1.9	...
17. Backward spring forward somersault	1.9	...
18. Backward spring and $1\frac{1}{2}$ forward somersault	2.0	...
19. Forward jack-knife $\frac{1}{2}$ corkscrew	1.8	1.9
20. Forward jack-knife with full corkscrew	2.0	2.0
21. Backward jack-knife $\frac{1}{2}$ corkscrew	1.9	...
22. Handstand dive	1.0	...
23. Handspring dive with somersault	1.3	1.3
24. Pike forward and comeback	2.0	2.0

SAMPLE SCORECARDS AS FILLED OUT BY JUDGES AND SCORERS

The judge fills out this card, then hands the card to the calculating committee who write the Degree of Difficulty figures and reckon the table, then place the figures on the Summary Card after which all the scorers sign the Summary Card.

JUDGE'S CARD

Name	H. Lewis			V. Kiffe				J. Gonzales				Ted Smith			
No.	Compulsory Dives		Points	No.	Compulsory Dives		Points	No.	Compulsory Dives		Points	No.	Compulsory Dives		Points
1	Run. Swan Dive			1				1				1			
2	Run. Front Jack-knife			2				2				2			
3	Back Jack-knife			3				3				3			
4	Back Dive			4				4				4			
	Voluntary Dives	Degree of Diff.				Degree of Diff.				Degree of Diff.				Degree of Diff.	
5				5				5				5			
6				6				6				6			
7				7				7				7			
8				8				8				8			
9				9				9				9			
10				10				10				10			
Total Points															
Place No.															

Checked by Jack Ross — Judge's Signature — Adam Brown

SUMMARY CARD

	Lewis		Kiffe		Gonzales		Smith	
Judge	Points	Place	Points	Place	Points	Place	Points	Place
Brown								
Black								
White								
Total								
Final Placing								
Average Points								

Scorers' Signature:

Will Green James Cerise John Grey

The result of the competition is determined by adding the place numbers of each competitor. The one having the lowest total of place numbers wins. In the event that there is a tie for place numbers, the competitor having the greatest average number of points wins.

How to Score a Diving Competition

(Suggestions for Score Cards)

Blanks for voluntary dives should be supplied by the club holding the competition. After filling them out and signing them, competitors deliver them to the clerk of the course. The announcer announces each voluntary dive from these blanks when the respective competitor's turn comes, and the diving judges must see that the dive nominated shall be performed. After the competition these blanks are turned over to the diving scorers.

SAMPLES OF VOLUNTARY DIVES GIVING AN IDEA OF COMBINATIONS

DIVES	GRADE OF DIFFICULTY
1. Forward, 1 somersault, standing	1.0
2. Backward somersault, arms laid by sides	1.0
3. Flying Dutchman, standing	1.7
4. Flying Dutchman, running, with jack-knife, take-off both feet	2.0
5. Back Corkscrew and 1½ somersault	2.0
6. Jack-knife, forward, with half twist, standing	1.8

Competitor's Signature: H. Lewis

DIVES	GRADE OF DIFFICULTY
1. Forward, 1 Somersault, standing	1.0
2. Backward Jack-knife, with 1½ forward somersault	2.0
3. Flying Dutchman, running	1.8
4. Flying Dutchman, standing	1.7
5. Full Corkscrew, forward, running	1.8
6. Jack-knife, forward, with half corkscrew, standing	1.8

Competitor's Signature: V. Kiffe

DIVES	GRADE OF DIFFICULTY
1. Flying Dutchman, running	1.8
2. Pike forward and come-back	2.0
3. Full Gainer and ½ twist	2.0
4. Double somersault, backward	2.0
5. 1½ Backward	2.0
6. Backward jack-knife, with 1½ forward somersault	2.0

Competitor's Signature: Tom Gonzales

DIVES	GRADE OF DIFFICULTY
1. Backward jack-knife, with 1½ forward somersault	2.0
2. Forward, 1 somersault, standing	1.0
3. Come-back and ½ corkscrew	1.7
4. Backward, 1½ somersault	2.0
5. Full Corkscrew, forward running	1.8
6. Pike forward and come-back	2.0

Competitor's Signature: Ted Smith

NOTE.—Quite often the names of dives are changed by various committees, authorized and unauthorized. Different sections of the country know the same dive by different names. Degrees of difficulty are sometimes changed every year so that I would advise competitors to discuss the diving with the judges and get their ideas in order that there may be no misunderstanding. Quite frequently men are asked to act as judges in diving because they are more or less influential in the community. Such a man may know a great deal about diving, or he may not. It is not necessary for a judge to be a diver himself. I know at least two instructors of diving who cannot make one dive, yet they are excellent teachers. One such teacher kept his pupils aiming for height alone for six months before he allowed them to make one fancy dive. He aimed to get them up high and he obtained splendid results. It was very amusing, though, to see his own attempts at diving.

SWIMMING POOL RECORDS

Name	Class		Best Time for Yards							On Back		Plunge for Distance (one minute limit)	Remarks
	Sr.	Jr.	20	25	40	50	100	200	220	50	100		
JOHN GREY	x					25	56.4	2.15		31	61.3	60 ft.	Steady
WM. WHITE	x					27.2	58		2.45			63 ft.	Climbing
JOS. GREEN		x				27.4	60			36			New Boy
ARCH. BLACK		x				26	59			35			Coming Strong
JIM LAKE	x											74.6	6 inches more
ROBT. BROWN	x							2.52					Can do much better if tobacco is dropped

The Blackboard in the Swimming Pool.

SOME RECORDS OF SWIMMERS

A world record is not recognized if made in a pool of less length than 75 feet.

Faster records are made each year, and, some day, 100 yds. will be done in 50 seconds; the 100 yds. back stroke in 60 seconds, or even less.

Record makers very often become conceited or careless and neglect to train; they eat everything and any old thing; then along comes appendicitis—an operation and death, or, at least, no more record making. Force comes from the stomach—be careful what you eat, you record makers. Take a lesson from Barney Kieran who died from appendicitis. Use your brains and avoid dietetic errors.

In all athletic records, the only instance in which women can boast of holding their own with men is in the back crawl.

FRANK BEAUREPAIRE

1,000 meters	14.28
1,500 meters	21.54$\frac{4}{5}$

CECIL HEALEY

200 yards	2.11$\frac{1}{5}$

GEORGE HODGSON

300 meters (flat)	4.00

DUKE KAHANAMOKU

100 meters	.60$\frac{1}{5}$
50 yards	.23$\frac{1}{5}$
100 yards (straightaway)	.53

PAUL KEALOHA

100 yards (straightaway)	.53

WARREN KEALOHA

100 yards (back crawl)	1.06
150 yards (back stroke)	1.44$\frac{4}{5}$
100 meters (back stroke)	1.12$\frac{3}{5}$

BARNEY KIERAN

800 yards	11.11$\frac{3}{5}$
1,000 yards	12.52$\frac{2}{5}$
1 mile	23.16$\frac{4}{5}$

HAROLD KRUGER

440 yards (back crawl)	6.28

NORMAN ROSS

330 yards	3.21$\frac{2}{5}$
300 meters	3.45$\frac{1}{5}$

JOHN WEISSMULLER

50 yards	.22$\frac{4}{5}$
60 yards	.29$\frac{3}{5}$
75 yards (back stroke)	.46$\frac{3}{5}$
100 yards (back stroke)	1.05$\frac{3}{5}$
100 yards	.52$\frac{2}{5}$
100 meters (open water)	.58$\frac{3}{5}$
120 yards	1.08$\frac{2}{5}$
150 yards	1.27$\frac{2}{5}$
200 yards	2.02$\frac{2}{5}$
220 yards	2.17$\frac{2}{5}$
200 meters	2.17$\frac{2}{5}$
300 yards	3.23$\frac{2}{5}$
300 meters	3.35$\frac{1}{5}$
440 yards	4.57
500 yards	5.47$\frac{3}{5}$
500 meters	6.24$\frac{1}{5}$

ALEX. WICKHAM

50 yards	.23$\frac{3}{5}$

RELAY RECORD

McGILLIVRAY, SIEGEL, D.L. JONES and WEISSMULLER of I. A. C. at Central Y.M.C.A., Brooklyn, April 1, 1922

200 yards	1.39$\frac{1}{5}$

Under Water Swim

Robert Pearson

343 feet	1.49

Sybil Bauer (Back Stroke)

50 yards	.34 2/5
100 yards	1.15 2/5
100 meters	1.24 1/5
150 yards	1.59 2/5
200 yards	2.45 3/5
200 meters	3.03 4/5
220 yards	3.07 4/5
300 yards	4.19
400 yards	5.50
440 yards	6.23

Ethelda Bliebtrey

100 yards	1.03 2/5
200 yards (open water)	2.53

Charlotte Boyle Clune

150 yards	1.49 3/5
200 yards	2.32 4/5
220 yards	2.47 3/5

Gertrude Ederle

220 yards	2.49 1/5
300 yards	3.58 2/5
400 yards	5.22 2/5
400 meters	5.53 1/5
440 yards	5.54 3/5
500 yards	6.45 1/5
500 meters (550 yards)	7.22 1/5
150 yards (free style)	.15
440 yards (open water)	6.00 1/5

Thelma Finn

50 yards	.28 4/5

Helen Wainwright

220 yards	2.41 1/5
300 meters (free style)	4.19 3/5
440 yards	6.17 2/5
500 yards	7.09 2/5
1,000 yards	14.58 2/5
1,500 meters	25.06 3/5
1 mile	26.44 4/5

Miss Hoeft

50 yards	.28 3/5

Hilda James

150 yards	1.48
300 yards	4.08 2/5
300 meters	4.33 4/5

Aileen Riggin

300 yards	4.17 3/5

Miss Shand

440 yards	6.26 2/5

Mariechen Wehselau

200 yards (open water)	2.52 4/5
50 yards	.28 3/5

Andrew Carlton

880 yards	10.51 4/5

Arne Borg

1 mile	22.34

XVI. THE ART OF TEACHING SWIMMING

The joy of swimming is derived from a number of circumstances that have to do chiefly with specific gravity. The fact that the human body weighs from almost nothing to less than a pound at most when in the water enables us to perform twisting, turning, and somersaults in the water with one-tenth the exertion required to perform the same out of the water. The reposeful, relaxing sensation, so pleasant to the nerves, of lying down in a substance softer than eiderdown enables the swimmer to forget all troubles. On the other hand, the tensed and distressed features of the non-swimmers in the water at once mark them apart to the onlookers.

The art of teaching swimming in mass is so vastly more productive of results, in every way, than the old method of teaching an individual at a time, that it is entirely displacing the old methods that have held the art back so long. The massed class may be a class of anywhere from 20 to 100 persons. It is best to classify the pupils into the following divisions: 1, Very, Very Timid; 2, Very Timid; 3, Timid; 4, Beginners; 5, Intermediate; 6, Advanced; 7, Divers. It would be best to keep children separate from adults. The water should be quite warm, say from 80° to 85° F. The water should be quite shallow, not over four feet for adults, and not over three feet for children. The water should be quite clear if possible. Indoor and outdoor pools are generally much better places for swimming instruction than in the open water outdoors. Classes 1 and 2 could be better managed in water of two feet depth, so that they could place their hands on the bottom. I put classes 1, 2, 3, and 4 through the Fear Eliminating Drill, which is as follows:

Those who will do so, I have enter the water by the racer's plunge. This is a flat, long skimming dive, taken from the water level to the height of one foot above the water. The pupil will lean down towards the water until the balance is lost, then spring hard horizontally, landing on chest, having hands extended and tips of fingers turned up. On striking the water, the eyes should be open and the pupil should drift as far as possible; with a deep breath

taken in through the mouth, then shut the mouth and keep it shut while drifting. Many first timers will drift across a 20-foot pool the first day after a few trials. This feat will knock a lot of fear out of the pupils. It is a good plan to have the entire class do the plunge together. Many will jump in feet first, others knees first, while some will land flat and proper. But it is a beginning and once all are in the water, start the drill best adapted for the class.

The art of teaching is a very real art and is characterized by a very strong desire on the part of the teacher to make people happier and better able to enjoy existence.

Training.—To get one's self in the best condition for the expenditure of dynamic force, the individual must lay up a store of unexpended pep that wild horses cannot hold back when finally released. And any one can do this if he goes about it right. Great muscular energy, we all know, comes from having big lungs and a strong heart. But the lungs and heart are manufactured by the stomach and its associates. Eat right and eight-tenths of the battle is won. What to eat is of so much importance in training that I have known of many instances where, although contestants did not swim for a whole week before an event but simply kept themselves in good condition by confining themselves to a balanced diet, they easily won the races that they entered.

The particular man who desires to get into the best possible condition will want to know the whys and wherefores of everything. Therefore, I wish to explain to the minutest detail in not too technical language, the causes of successes and failures. Now failures and successes all start at the meal table, even from the day of Adam, who ate some food that made him drunk. The alert person who desires to be in the very best possible condition will eat right for success; wrong means failure. And in my opinion this chapter on training will give far more value than all the other chapters put together.

I therefore submit the following dietetic advice for training:

A morning meal of bacon, eggs, toast and coffee will result in introducing into the stomach more material than is needed, and I point it out as one explanation why more than half the people are sick all the time.

The first meal for the day should be of a cleansing, light character, such as raw, subacid fruits. The bad habit of smothering grape fruit with sugar and sprinkling salt and pepper over melons indicates a morbid appetite. Then, to spread mustard over semi-

rancid meats is another bad habit, as is the covering of fish with a strong sauce. The excessive salting of any food causes the individual to drink large quantities of water greatly in excess of normal. All these facts may seem of small importance to a person who argues that those who enter gruelling swimming races are so full of pep that little things like the above cannot possibly make any difference.

But I know positively that they do make a difference, as all highly trained athletes are very susceptible to the slightest abnormal strain on the digestive organs. When the saloon was on every corner in the working man's sections of all cities, those who could not afford the best of food, dieted on a generous serving of salt fish on Fridays; with the result that they developed an internal fever calling for an immense quantity of fluid of some kind, and as the next day was pay day, they went to quench their abnormal thirst at the saloons. The desire to drink abominable bitter and pungent liquors is almost entirely the result of the use of pepper, mustard, and the excessive use of salt. The use of salt with potatoes, turnips, carrots and spinach adds flavour and does no harm. But the use of salt with meat, fish, and eggs is most decidedly bad in its effects on the whole digestive tract. To all meat-eating animals, salt is a deadly poison. And to omnivorous animals, such as pigs, the use of salt is decidedly injurious. All hog cholera can be traced to swill in which salted meats and salted fish were put in quantities; the germ of hog cholera is only an accessory and not the basic cause, as is true of germs in all diseases.

Just try a dinner on highly salted soup and then try yourself out for an event requiring energy. Dr. R. T. Thrall, of New York, wrote a book in the middle of the last century against the use of salt and inorganic minerals by man, and yet it is only recently that the doctors as a whole are finding out that the use of salt causes high blood pressure and brings on kidney and bladder troubles.

I have apparently diverged a little from the subject, but have done so in order to convince my readers that I really know what I am talking about when on the subject of training, as I firmly believe that I know even more about getting into good physical condition and keeping there than I do of the art of swimming, in which everyone tells me I am expert.

Why have so much objection to pepper? By actual tests, the use of pepper does as much damage to that very important gland, the liver, as does the use of gin. This should settle any one's mind

as to the use of pepper, as it takes the pep out of the contestant as much as does highly salted soup.

Picnic parties very often start out for a day of health in the mountains, woods, or seashore, carrying a collection of the most injurious foods and drinks obtainable, such as painted canned meats and dyed drinks, and then return home very much the worse for their holiday. Now, using our common sense we should indeed select a healthful type of foods for such an occasion. On the other hand, some of the best brains in the world go out to the Italians' fruit, vegetable, and nut carts and select an entire meal there and never know an hour's sickness. I do not intend to give a menu for morning, noon and night. I simply intend to advise what is safe and what is unsafe for good health. I will also advise against that old saying "that what is one man's food is another man's poison." There is far too much stress put on that idea. In my opinion what is one man's poison is every man's poison. The fact that some cannot eat strawberries is by no means a proof that the strawberries are injurious to them but an evidence that the strawberries are facilitating the elimination of poisonous products from the system, and may be really of very great benefit in prolonging the life of the person by preventing the internal accumulation of pus.

In my dietetic hints for training I advise very strongly against the use of milk chocolates. Such chocolate, eaten liberally on a train by a team of athletes on the way to an important contest, is a very much quicker method of anchoring the contestants to the ground than any other method I know of. The reason for this is that when milk is cooked in chocolates, macaroni, biscuits, and even cake, it is converted into millions of minute, artificial billiard balls that are so difficult—so impossible—for the gastric juice to dissolve that a form of casein poisoning results, obstructing the liver and so burdening and depressing the motor centres of the brain that far from the best results are obtained from the food eaten. If it is necessary to eat chocolate, then select that brand that is flavored with sugar and vanilla only, and not those milk chocolates.

I very highly recommend all fruit and vegetable salads. But the vegetable salads must not contain vinegar. Vinegar is rotten alcohol and is far more destructive to the internal economy than alcohol; and if we had taken it in the same quantity that we have alcoholic liquors human life would long ago have vanished from the earth. It does not induce repetition as alcohol does: that, and that

only is in its favour. Use lemons instead, as they are an acid of growth, while vinegar is an acid of decomposition.

While writing about acids I must say: be sure never to use rhubarb in any form as it contains oxalic acid, which is a poisonous acid, causing the discharge of serum instead of bile into the intestines; and the loss of serum from the blood causes muscular weakness—the one thing we wish to avoid. Willard, in his fight with Dempsey, trained on rhubarb. To try and reduce fat by the use of rhubarb and vinegar is highly destructive to the entire system.

I would strongly advise against the use of raw white of egg. By the most scientific tests possible it has been found that the raw white of egg is absolutely impervious to the action of human gastric juice and causes a form of diarrhea.

The Egyptians and Chinese keep themselves healthy in vile smelling environments by eating great quantities of green stuff. By eating kale, curly green cabbage, Chinese cabbage, chard, beet-tops, spinach, lettuce, celery, etc., with our meats, fish, etc., we carry everything out and sweep clean the colon the first thing on arising and soon after each meal; which is the normal way of all the animal kingdom in its natural state; only men and animals in unnatural environments are the exceptions. When the skin, lungs, etc., are called upon to perform vicarious functions, high pressure is required and the results are known under the name of various diseases—though the real disease is only one, constipation; the cause is filth—and nothing else. By reading the first chapter of Daniel and following along on like grounds one may secure a fund of knowledge on how to keep well far in excess of all the information obtainable elsewhere—in other words, the best information in the world will cost one nothing. As a proof in point: Some years ago a young man I met on a New Year's Day, playing water polo in the New York Athletic Club, informed me that he was about to spend several thousand dollars on an eye specialist. In a very rough, sarcastic manner, I told him to keep his colon clean by eating plenty of coarse food and then his eyes would clean themselves. He took me at my word and it was simply astounding even to me how rapidly his eyesight improved. Now, some persons would have blamed the water for his failing eyesight, just as many old, bent-over men press their two hands on their backs complaining of kidney trouble and rheumatism; whereas, the trouble is in front and not in the rear, as it is the compacted colon pressing on the nerves behind that causes the

lumbago. If, in this product, germs find enjoyment, they are not there because your own cell structure calls for them; they are foreigners, not wanted, and to be violently ejected in the form of fever, etc., if the person is even well enough to be sick. But some people are so exhausted with drugs and serums that they are too feeble to be sick and either die suddenly or accumulate great pus sacs internally and the surgeon does the rest.

XVII. THERAPEUTIC VALUE OF SWIMMING

What special curative value has the practice of swimming? It has very many values in its power to fortify the body against weaknesses and hence against disease; these I shall specify in the following order:

1. The *Spine:* The rotary actions of the body in swimming the various crawl strokes, and the trudgeon stroke, cause such a movement of the entire spine as to permit so free a flow of nerve force through the spinal channels as to be auto-chiropractic. The anterior-posterior, and the lateral movements of the spine, when the body is relaxed, and in the horizontal position in the water, are of enormous value to the growing child, especially to those who have been affected by infantile paralysis; such movements also surely develop a taller growth. A strong spine is of tremendous importance to everyone who wishes to live through life and accomplish a great deal. As the control of the body passes through the spine, any pressure on the nerves emerging from the spine to the various organs affects greatly and sometimes totally interferes with the function of that organ or muscle and hence causes various *dis*eases instead of ease. Crooked spines cause untold suffering in the world. Therefore see that all growing children do a great amount of swimming, and then, if the food is right also, they cannot possibly grow crooked spines.

There is no doubt but that adults can, to a certain extent, benefit their spines by swimming, as the snake-like contortions of the body in twisting and turning are always taking place when one is active in the water, and especially in such feats as the "rolling log" stunt. There are, without a doubt, far more spinal motions performed in swimming than in any other athletic activity; and with this advantage over tennis that the motions are much less strained, and still less so than in wrestling.

2. The *Glands:* I cannot conceive of any special value to the kidneys derived from swimming; it might be that, by keeping the skin pores open, the skin would thus be enabled to perform its func-

tions better and therefore the kidneys would not have to perform vicarious duty for the skin. On the other hand, I am very much inclined to the opinion that swimming in cold water would oblige the kidneys to perform vicarious duties for the skin, which is far from beneficial.

While cold water swimming might not do the liver much good, swimming in warm water would be a tremendous help and assistance to that very large and important gland; as the liver has no muscular contracting and expanding ability of its own, and is dependent upon the force of the heart beat, and the voluntary movements of the trunk of the body for its circulation. And thus, the twisting, squirming, bending motions of swimming would stimulate that gland to perform its functions with ease instead of strain, and thus ease would result and not *dis*ease from the perfect purification of the blood by that gland. In water that is not uncomfortably cold, just try a game of water polo for a sluggish liver and you will thoroughly understand what a tremendous help swimming is in getting one out of the blues.

The *Pancreas* would benefit after the same manner as the liver and this fact explains why all swimmers have a nice, even layer of adipose surrounding their muscles; as this gland emulsifies the fats, thus permitting of their assimilation and perfect use by the body. In my observations I have noticed many very attenuated persons by persisting in swimming put on a nice, even layer of adipose (yellow) around the outside of their bodies, making them smooth though, at the same time, slender.

The *Skin* is the gland that covers a very wide surface and thus would derive extraordinary, increased activity from not only the water, but the action of the sun and air on its surface. The action of the sun on the skin would draw from the core of the body poisons that were exceedingly destructive to the lungs and other organs, forming pus sacs and ulcers which, when concentrated in the internal sections, are very serious; but when thrown out by the large skin surface are derivative and though unsightly in extreme cases are never nearly as dangerous, as may be reasoned from the fact that persons having smallpox die at the ratio of one-tenth of one per cent, whereas they die at the ratio of ninety-nine and nine-tenths per cent from tuberculosis. Thus tremendous benefit results from drawing the blood to the skin by sun, air and water as much as possible. I would send all feeble persons to a climate where the skin will have a chance to do the heavy depurating work for the liver,

lungs, and kidneys. Swimming tremendously improves the complexion of muddy, yellow people.

Tanning the skin in the summer time should always be done very gradually; say, one hour's sun exposure the first day, then one hour's exposure the second day, and even for the third and fourth days, then two hours' exposure on the fifth day, one hour in the morning and one hour in the afternoon. And in the second week, two hours' exposure in the mornings and two hours in the afternoons. In the third week, the skin may be exposed to the full rays of the sun all day long and no blistering will result. The use of nuts in the diet will greatly benefit the skin, as the oil of nuts is of especial value to the skin, while fish oils and pork oils taken internally generally cause cracking of the skin when exuded. Fish oil is expelled by the skin shortly after eating, even as far away from the stomach as the finger tips. Thus one may very readily understand the functions of the skin in casting out rancid poisons (unusable matter) and the aid that water, sun and air would have in thickening and strengthening the skin and thus enabling it to place the body at ease and free it from *dis*ease.

The *Lungs* are also glands and are probably the most important glands in the body. Swimming indoors in a vilely ventilated natatorium would be sure to cause pneumonia or a permanent cold (tuberculosis), while swimming in a well ventilated natatorium, where the sun can shine all day long in the mid-winter periods of clear days, and swimming outdoors in the pure air of the lakes, rivers and ocean, will enable the lungs to throw out an enormous amount of poisons, and do an unbelievable amount of good to the system; purifying the entire body and mind to an extent, surpassing anything of benefit that might be derived from massage and all other forms of treatment that I know of, practised for the obtaining of health. This is very largely because: In swimming, ultra deep breathing is one of the main features of the art; whether sprinting, swimming long distance, playing water polo, or doing stunt swimming, the swimmer must make ultra deep breathing the very basic feature all the time. And thus half-diseased lungs may be renovated and enabled to perform their normal functions and be brought to a condition of ease and away from *dis*ease.

3. The *Stomach:* Swimming and contorting the body in the water will aid that thinly coated muscular organ, the stomach, to churn and function properly. First, though, it is important that we realize the fact that as the stomach is the beginning of ourselves,

we should be very careful what we put into it to become ourselves. That swimming would help us to turn semi-putrid, salted fish and meats into perfect white blood corpuscles that could fight *dis*ease, would be absurd. But in those whose functioning ability of the stomach has been partially destroyed by the use of vinegar, peppers, salt, candy, glucose, soft drinks, condensed-milk ice cream, and other things that are decidedly difficult of absorption by and irritating to that organ, swimming would greatly assist that most important organ, but could not possibly cure until a very radical change in diet for the better was instituted and continued for some time. (See the Section on Training for advice on diet.)

Persons sometimes become seasick when swimming long distances in rough water and the stomach will throw out its contents. This will do the person much good and clear the system of undesirable matter though it would inconvenience him for the time being.

Another peculiarity about the power of swimming to clear the stomach of pus and ulcer formations is evidenced by the constant hawking and spitting up of slime of various colours from the stomach. When yellow or blackish, then the ulcerous conditions border upon tuberculosis and it is a positive warning to that individual to eliminate certain foods and clean the stomach by giving it a good sweep, which may be accomplished by a diet of greens.

4. The *Bowels:* That swimming may aid the peristaltic actions of the intestines and help carry on the functions of the small intestines and colon, is a very positive fact, proven again and again. Most stomach troubles originate from a sluggish condition of the colon, though all do not, but the fact that most troubles do, should cause us to try and cultivate powerful peristaltic action and a regular habit of eliminating stools the first thing on arising in the morning and soon after each meal. And swimming is such a tremendous aid to this secret of the art of good health and long life, that I recommend it as a treatment for constipation and as prophylactic for the bowels. Of course, I do not say that swimming would completely offset bad dietetic habits in this respect, but as an aid to bowel strength, swimming has very great power for good. Certainly, swimmers who swim all the year round without a stop never contract appendicitis—which disease is nothing more or less than intense constipation of such a malignant nature that not only is the vermiform appendix inflamed but much surrounding tissue as well. The appendix being cut off is as good a cure for vile dietetic habits as cutting out the eye for blindness would be, and as sensible. But,

of course, when pus has settled in the appendix, it must be cut out, just as we would have the eye removed if it turned to pus, but not if it were merely inflamed; in too many cases the appendix is cut out for an inflammation that would recede if proper, non-toxic, dietetic habits supplanted the bad habits that caused the trouble.

It might seem as if I were going out of my subject in stating these facts, but so many good athletes have met death on the operating table by having the appendix removed that I think too much stress cannot be laid on facts, as I have observed them; for I have observed a number of very fine athletes meet their final doom through this evil, and one of my objects in writing this book is to help preserve human life by right living, as part of which only I include swimming. I should like to help ward off untimely death from these other causes as well as from drowning. Incidentally to the preservation of human life, I aim to increase people's happiness by giving them control over that part of their environment which is water.

5. The *Nervous System:* Young men who take long swims I find are almost entirely free of those disturbing dreams which afflict so many young men, dreams that are, in my opinion, unnecessary and avoidable. On the other hand those who do not swim but who yet undergo great physical exertion either in manual labour or in track and field athletics, report no cessation of those thoroughly disconcerting dreams, which needlessly sap their strength. It is very evident to me, therefore, that there is something in the contact with the water that induces more perfect sleep than the sleep induced by exertions on land. Two other conditions are required in addition to swimming to attain this perfect sleep: sleeping on the side, not on the back, and hygienic diet.

I am not writing this book for the nervous systems of those who would drop into a rut and die without a kick, nor for those who would wish to lead the life of Swiss Family Robinson—and have everything in this world come to them without a struggle. I write for those men and women who wish to strengthen their nervous systems so that they may raise a very much better generation than ever was raised before, and fight for that purpose, and fight hard.

Swimming, strengthening the nervous system, strengthens also the moral fibre of young women. Who has not noted the independent swing of the young woman who can swim well? Only enemies of womanhood can object to strength and independence in women.

Swimming gives power to girls to hold off normal functions until normal times. The girls who can swim well can face difficult situations in life far more readily than the non-swimmers.

Swimming and diving will enable our nerves to become strong as no other exercise will. Take the business man and woman whose nerves are verging on the very edge of insanity, and teach them the co-ordination of swimming and observe how extraordinarily quickly they forget their troubles. Co-ordination of the movements of the muscles of the body as performed without strain, as in swimming, is excellent for the brain, as my many years' experience teaching mental patients at the Battle Creek Sanatarium has thoroughly confirmed. The value of swimming in curing those mentally strained has not yet been properly appreciated for I have yet to hear of a swimming pool in insane asylums. In passing I should like to add that when they reach the point of putting pools in sanatariums for the treatment of psychopathic conditions, they should also reform the diet for the food fed in such institutions as I have inspected is such as to prolong their troubles. Daniel and Nebuchadnezzar knew more about hygiene and the cure of the insane than all the doctors in the insane asylums to-day.

6. The *Heart:* When patients come to them for advice about bad heart conditions, many doctors strongly advise them that they must not swim. From my experience with heart cases I would say: If a heavy man, a clumsy swimmer, has a weak heart, by all means let him keep out of the water; but for those women, for instance, whose specific gravity is so light that they can float without the least difficulty, swimming would be a very much lesser strain upon that great pumping station, the heart, than would walking. The heart is perpetually at work and is strengthened by a rest and correct swimming would be a comparative rest that would do that organ an enormous amount of good and prolong life.

7. The *Feet:* Thousands of times I have been very greatly shocked by seeing otherwise most beautiful women with hideously formed feet and toes. Walking for miles on the soft, wet sand of the sea, lake and river shores, will greatly help the toes to return to a normal shape; but it must not be left too late, as permanent hammer toes, as well as bent-in toes, will not return to normal under any amount of walking in soft, wet sand. It seems as if some vile beast-spirit informed shoe manufacturers directing them to make shoes that not only tilt women forward and throw the womb out of place, but also hideously deform the toes and feet. Therefore,

women cover up their feet with stockings or socks in order that the other bathers may not see these defects. But now that bare feet are popular at public bathing beaches the shoes with sharp-pointed toes are doomed. I need say very little about that stupid style.

Swimming, as an offset to walking on the dry, hot pavements of the city streets I think can't be equalled. Very few realize the fact that the blood in the head travels to the feet and back again in a few minutes so that to case up the feet in air-tight, hermetically sealed leather boxes is to induce pressure, and this is reflexed upon the brain, and makes headaches and all kinds of trouble.

8. The *Limbs:* Dropsical limbs are rapidly reduced to normal after long and continued swimming, without causing unsightly varicose veins to form, as is very often the case when heavy muscular strain is centred on the leg muscles by running, jumping, climbing, and heavy lifting under varicose conditions.

The pipe-stemmed leg swimmer will very soon have an even muscular shape take the place of attenuation, and an even layer of adipose will still further round off the legs. Also a similar improvement will occur around the ribs. Swimming has a very much more powerful effect in rounding off the attenuated than it has for reducing the corpulent, as the obstinately corpulent can only reduce the internal, dangerous fat and the very unsightly, misplaced fat, rather than the weight of the person, and that large overplus of even-layered, solid fat which can only be gotten rid of by very strenuous crawl swimming.

The person who has thin, scrawny arms can, with wonderful rapidity, develop the upper arms close to the shoulder to a very astounding extent. Just try swimming the crawl and trudgeon strokes as well as the back crawl for thin upper arms. Through having to hold the hand hard and flat open, the fore-arm muscles are also developed considerably.

9. The *Shoulders:* Everyone has noticed, time and again, the immense superiority of the shoulder structure of swimmers over all other athletes. Breadth of shoulders at once stamps the swimmer as superior to the land athlete. To a growing child the crawl and trudgeon strokes are of such value that no money estimate can possibly be made; but I venture to place it at the very conservative value of $100,000 to each boy and girl in America who is taught that stroke. But it does not *cost* that. To many thousands of boys and girls have I given six lessons for ten cents in one week; teaching one thousand each day for a week brought in one hundred

dollars for the week; which will demonstrate how very valuable and economical the massed system is to the world.

We know that a fixed upper chest predisposes to consumption and that the shoulder action of the crawl stroke positively prevents this condition.

10. The *Ribs and Lower Chest Walls:* The heaving up of the shoulders that takes place during each motion of the crawl stroke, not only throws the chest forward and straightens the spine, but it throws out the lower ribs and develops that very full-chested condition so noticeable in grand opera singers, indicating that swimmers are chest-breathers and not belly-breathers only.

11. The *Vocal Chords:* The ultra-deep breathing that all swimmers are forced to make extends the base of the lungs so as to strengthen the diaphragm; and the strengthening of this chief breathing muscle clears the throat thoroughly and prevents inflammation around the vocal chords so detrimental to clear singing and public speaking. Thus, as a voice strengthener, swimming surpasses all other exercises, with the possible exception of mountain climbing.

12. The *Hair:* Ramming a lot of soap into the scalp destroys the hair roots so that it falls out permanently; and especially so the very bad habit of getting under a hot shower and rubbing the soap deep into the scalp, draining the natural oil out of the scalp. I am fifty-six years old and I have all the hair on my head yet. I never put soap on my head, nor allow a hot shower to play on my head; and I always wash my hair and head with pure, soft water. Frequent, high diving might be rough on the hair, but, so far, I have not found that to be the case, and merely mention it as a reasonable possibility.

13. The *Nails:* The nails of swimmers grow very rapidly, which is a sure sign of good health.

14. The *Pelvic Section:* Swimming will strengthen the womb and appendages as no other exercises will, and is far more dignified than running on all fours, as some Paris doctors advise. Swim, but not in cold water, up to the last minute of childbirth, is my advice to women who desire to have an easy time in one of the most important functions of life.

Swimming: a vigorous offensive against physical deterioration.

Swimming prevents: crooked spine
round shoulders
lung contraction
liver congestion

hernia
pelvic prolapsus and displacement in women
pot belly
narrow chest and shoulders
stiff joints
stiff muscles
clogged skin pores and skin diseases
self-centred thoughts and insanity
timidity
volvulus and intussusception
despondency
dry skin
splay and flat feet
flat chest
pigeon breast
too oily skin

NOTE.—In making this statement, I don't mean that anyone is to suppose that, ignoring diet, fresh air during the day, and in the bedroom during sleep, and other hygienic advice, swimming alone will prevent malformations, etc.

XVIII. NATATORIUMS

So very few architects have built ideal natatoriums in America that I would advise those contemplating the building of an outdoor or indoor swimming pool to visit several in order to get a proper idea as to the best style in which to build a natatorium. Of the many hundreds of swimming pools where I have taught and which I have visited, I should recommend, on the Pacific Coast, the Sutro Baths in San Francisco, which are by far the finest in the world, and are very likely to remain so for a long time to come. They are not perfect but they are so far ahead of other natatoriums that I mention them first. The pool in Madison Square Garden, New York, is well worth visiting; the centre section is deep, while by far the greater space at each end is quite shallow; which is as it ought to be. The idea of making artificial surf, as in the Palisades Park Pool, New York, is not to be recommended. The Hart House Pool at the University of Toronto is a splendid type of pool for full-grown men only; it has a shelf running its entire length at each side, two feet wide, and three feet from the scum trough, making a very handy rest place, as the pool is everywhere over the men's heads. This pool is my design, except for the pillars that obstruct the view of the onlookers, and which I unsuccessfully opposed.

The Detroit Athletic Club also has a splendid swimming pool in its building, which has a beautiful southern exposure, and a gallery all around. The Pittsburgh Athletic Club has a two level scum trough, for high and low levels. At Venice, California, is a very fine pool, well worth seeing. The High Park Swimming Pools at Toronto are two big outdoor pools that I designed for Dr. McCormick, and are also well worth a visit.

To have what is known as a "fast" pool, it is necessary to plan to have a wide pool. A pool 75 by 25 feet, as the Central Y pool at Brooklyn, becomes very wavy during a race; when four swimmers are rushing up and down through the water, it is in a condition of "rough water," that is, it is not a pool where swimmers can make the best time. A very wide pool, such as that at Columbia University, which has a volume of water on each side of the lane

marked off for the swimmers, makes for quite smooth water during a race. But I don't want to be understood as upholding the pool at Columbia as a model because I really consider it an unsanitary pool, very poorly constructed, with no scum trough, and with horribly ventilated dressing rooms.

Whether the swimming pool is to be outdoors or indoors, the very first and most important requisite is a full, strong southern exposure that will admit the full force of the sun, without any obstruction, at present existing, or possible in the future, to play on both the water and the atmosphere. Have the indoor pool receive the winter's sun from 9 A.M. to 3 P.M. Electric lights are a poor substitute for the winter's sun.

Under no consideration use gas to light an indoor swimming pool as the burning of gas in a natatorium will very soon devitalize the air and render swimming in such a place positively dangerous to the lungs of the swimmers.

Gas hair dryers should never be installed in the women's locker rooms as they are very destructive to the atmosphere. They cause all manner of throat and lung trouble; in fact, as a producer of colds they fully equal the bad habit some women have of sitting through a swimming meet in furs. There are many good electric hair dryers on the market so that gas hair dryers should never even be considered.

Still more important is the ventilation system of natatoriums. The ceilings should be high, and window ventilation, as well as ventilation by exit fans, as in the Brooklyn Central Y. M. C. A., is highly desirable. The air temperature in indoor natatoriums should on no account be hot and dry but should be warm and damp. Hot, dry air indoors is entirely different from the hot, dry air of the plains and deserts as it is terribly destructive to the lungs. When coal was cheap and offices were overheated with hot, dry air, hundreds of people developed pneumonia, and died as a result. See that the radiators are not placed under the gallery so as to roast the heads of the swimmers and to cook the onlookers in the gallery, while the feet of the swimmers are cold walking around on the cold pavements surrounding the pool. A very good plan is to have the heating system warm up the pavements around the pool. Note especially, if you want real comfort, there should always be an adjustable ventilation system, whereby the janitor can on occasion let in a great volume of fresh air when it is a warm, soggy, winter's day, and there is a large audience to view contests and exhibitions.

As to the sanitary arrangements of the water supply, one need not worry much where natural hot springs supply the water in the pool; as a constant flow in and out, as in a living stream, will make it perfectly sanitary and, by completely emptying the pool once a week, the sediment that always settles at the bottom can always be cleared out. But where refiltration takes place, the janitor should be somewhat of an analyst and have a knowledge of chemistry, though not necessarily a high and perfect knowledge, but enough to understand what he is doing when he is keeping the water of the pool free of germs. There should be not one filter, but several; there should be a hair strainer to catch not only hair, but chewing gum, hair pins, etc. The many different makes of filters now on the market for use in swimming pools have been so perfected that I cannot recommend one over the other.

To oxidize the germs to death, or to chlorinate them to death, or to violet ray them to death; and then, to gather in their dead bodies, together with all the hair, grease, skin scales and sputum, by the use of alum and sand is a work of art that the janitor will acquire to perfection by long practice. Thus very much depends upon the janitor; in fact I think that the janitor can either make or ruin an enterprise by his skill or lack of skill. They are the main guys around any large building! As for the violet ray, it is an expensive method of germ destruction, as the exposure time should last ten seconds, whereas only three seconds are given; and the system must rely upon the filtration in any case. I doubt very much as to my being able to recommend the violet ray system.

When I have a campaign week on, the water purifying system undergoes a very severe test, as I very often teach 1000 boys and girls a day; and these many extra swimmers will do some water polluting in spite of all precautionary measures.

Where refiltration takes place, much saving in coal is effected as it is a very expensive system to bring the temperature of winter water, which is anywhere from 35° F. to 55° F., up to about 80° F. each day. Some Y. M. C. A.'s. have such a perfect system of refiltration that they need only to empty the pool once a year!

In northern cities very much heat may be saved by having double windows in the winter, as the steam striking the cold glass condenses and throws a constant stream of cold air against the water, abstracting an enormous amount of heat from the water during the night. Thus, if the windows are above the pool, as building conditions often necessitate, the constant flow of very cold air descend-

ing on the water takes away an extraordinary amount of heat. The radiators of course could be placed under the windows but that is not quite sufficient as the room must also be heated. The matter of sufficient, pure, warm, comfortable fresh air entering the natatorium, while there is a continuous exit of foul air, is a study for the architect to be considered with deep thought.

In the days of the horse, I have seen big piles of horse manure banked up against the natatorium windows, or rather just below them, so that it was impossible to open the windows! Therefore, in locating a natatorium site, great care should be taken to see that no bad odours permeate the neighbourhood and blow toward the building.

The shower bath system in natatoriums should be well considered before being placed. I am against all the mixers I have yet seen; they get out of order, and people who use showers should have enough brains to be able to mix their own hot and cold water. Again, that system whereby sixteen showers are turned on at once is terribly wasteful, as I have often seen all sixteen showers running for one single boy; it is a system that is supposed to be economical but is the opposite.

Pitch is of tremendous importance in a natatorium. By all means have the exact pitch which will give quick drainage. Many times I have taught at Y. W. C. A.'s where the drainage was such that the girls had to undress and dress in water ankle deep!

Also, it is almost unbelievable how very offensive and smelly the air in a shower room will get if there are any cracks or crevices in the ceiling, walls or floor where water or steam, either pure or soapy, can be absorbed. Every crack and crevice should be thoroughly cleaned and filled with cement.

The open scum trough is good; it should have a lip sufficiently prominent and narrow enough so that pupils may easily secure a grip on it with the upper hand so as to hold on to the wall to practise the scissors kick. This is quite important and must not be overlooked.

The scum trough is absolutely necessary for sanitary reasons, as it prevents water on the walk around the pool from washing into the pool; it is a cuspidor, as it carries off the floating grease and such animal effluvia as rises to the top; and this is the most dangerous. Wash the top water and you get the most dirt off. Hair floats at first, then sinks, and then gathers up into balls and may be seen at the bottom. If the scum trough has sufficient bell traps

of sufficient strength to carry off the water as it washes into it, without permitting it to flow back again from a wavelet, then all is well. These traps should be at each corner and eight feet apart all around; the scum trough should always surround the pool completely; even if recessional steps are placed at the corners the scum trough should follow around also. The scum trough should be absolutely level all around; if it is not, then warm water may flow in at one point, rise to the top and flow out of the trough immediately above the hot water entrance pipe; thus, when all is quiet, the new water entering would not sweep the dirt from the surface but merely flow out again.

Swimming pools are built far too deep for sanitary, economical and utilitarian purposes; the shallow pools are much the best, with a deep spot at one point, and spoon-shaped; thus making the deep part at the diving board. The exit pipe should be at the bottom, in the centre. Thus the exit pipe can gather up all the heavy sediment, and the janitor can easily sweep the dirt to this point where it is sucked out. This will also do away with the necessity of having a long vacuum pipe broom, though the vacuum pipe can be used to take up sand and mud from the level section.

I would suggest that a seventy-five foot pool should have fifty-five feet of shallow depth of a little over three feet, which is deep enough for a giant to swim in; and if it is a children's pool, I would say that a yard is quite sufficient depth. For adults the deep part should not be more than nine and a half feet, and for children not over five and a half feet, which is deep enough for fancy diving. I can dive from a high roof into eight feet of water and be in no danger of touching the bottom. Thus a pocket for deep diving is the type that I recommend.

Pools should always be built of even lengths, for both outdoor and indoor pools; thus: 300, 200, 150, 100, 75, 60, 50 feet long; and 50 feet should be the minimum length for a swimming pool and 18 feet the minimum breadth for a 50 foot pool; 20 feet the minimum breadth for a 60 foot pool; 25 feet for a 75 foot pool; and 35 feet for a 100 foot pool. It is a very good idea to have pools one inch over the length. No world records can be made in a pool less than 75 feet in length. Never build an odd length pool.

The gallery should always completely surround the pool—where spectators are admitted; and all pools should have spectators, as spectators help the sport of swimming immensely. It is the right

of skilful youth to expect to be seen in their victories. The gallery should not reach to the edge of the pool but should be proportionately back so that those on the rear seats may see the entire pool. The seats in the gallery should slope at least at an angle of 45°, and in some cases even 60° is necessary.

No pillars should obstruct the view of the onlookers; they may be ornamental, but they have neither economical nor utilitarian value.

Both hot and cold water pipes for hose attachments should be liberally distributed around under the gallery and the walk around the pool.

Keep all matting from the pool as it very soon becomes odoriferous to a disagreeable extent. The idea of having a cork edging is all wrong, as it very soon breaks up and becomes ugly and unsanitary. Do not have the cement so polished that it becomes slippery to the point of danger, as the floor, with the aid of soap and water, becomes positively dangerous and many fractured heads may result from falling on the back of the head.

Natatoriums can use the waste hot water from ice plants and factories, especially from cotton and oil refining factories.

It is a very fine art to secure proper acoustic properties; in fact, an almost impossible task in a natatorium, as the combination of water, brick or stone makes for a condition like a great cave.

In heating: the water in swimming pools should be heated before it enters the pool, and then as it passes from the filter on the return, and not before it enters the filter. Steam pipes should never be placed in pools and no projections whatever should stick out from the walls in the shape of pipes, ladders, etc. The water should always be run into the pool at a higher temperature than required, as it very soon cools off. The exit pipe should be large enough to allow the pool to be completely emptied in an hour. A guard should be over the exit pipe as a swimmer's foot might be drawn down; it will also prevent towels or other articles from going down.

Note, that in measuring the water level, it will be a few inches below the scum trough, as the wash over will keep it down when not still.

Dark green tile lines of sufficient breadth to be clearly seen by near-sighted swimmers should run the length of the pool about five feet apart and ending four feet from each end.

The proper position to place the diving apparatus should be well considered before the concrete sets, as a change will be very difficult afterwards.

Selecting colours for the swimming pool is of considerable importance. Recently the ceiling of the Brooklyn Central Y. M. C. A. pool has been painted a very beautiful, bright, light blue. It has made a wonderful difference in the appearance of the pool. Black, brown or grey should never be used. The pool itself is white, as also are the walls of the natatorium.

The matter of painting a plain concrete pool with white bath enamel is a very difficult task. After the concrete is thoroughly dried, the paint may be applied in coats by men who have had previous experience in this work. Then, when the job is finished, allow it to dry thoroughly, or it will come off in huge flakes. Black, dark green or navy blue lines may be drawn the length of the pool to guide swimmers when racing with their faces under the water.

The shower baths should never be in the same room with the swimming pool because it causes a too high discharge of steam in the air. The shower bath room must be well ventilated so as to carry all the steam out of the room elsewhere than towards the swimming pool.

Swimming pools up several stories high, where the strong winter's sun can get at the place, are placed a thousand times better than in the cellars of buildings. A pool which is built high up is, of course, suspended by powerful steel girders from the story above the pool.

Where great masses of men and boys swim there should be a pool for each, as at the Brooklyn Central Y. M. C. A. Men do not like swimming with boys.

Having pools at different temperatures such as those at the Sutro Baths is pleasant where it can be afforded. The Sutro Baths are at temperatures of 71°, 80°, 85° and 90° F. I found the biggest crowd in the 90° F. pool and the smallest crowd in the big pool which was 71° F.

Public school swimming pools should be about 2½ feet deep for teaching in.

The contractor who undertakes to make a swimming pool should thoroughly understand the system of waterproofing so that the pool will not leak, as there is a distinct difference in cement mixing and in waterproofing.

To mark the measurements of a pool in depth and length in

ceramic mosaic is a splendid idea; also the placing of signs such as: Do not go in swimming alone; Do not spit in the pool; Take a thorough, cleansing shower before entering the pool; Danger, deep part. A swimming record board is also a splendid incentive to look at. There should be attachments on the wall at each side of the deep end of the pool for the shepherd's crook life saving pole, together with a notice as to its purpose.

The ideal swimming pool, built for water polo contests, swimming races, diving events, should be 75 feet long and 50 feet wide, and should have high, steep-angled bleachers all around it. This would provide accommodation for a good-sized paying crowd of spectators for every event; there would be enough seats to make the affair pay very well. There should be no gallery.

The Spring Board

What is the best wood to be used in making spring boards? This is a question that occurs to many architects and contractors who build swimming pools. I find that Georgia hard pine is the best. It has a natural resinous consistency that resists decay fairly well, and does not warp like oak; and thus that bad twisting habit of oak is not present in it; also it is very much more resilient than oak; and resiliency is the main, desirable quality for spring boards. Georgia pine, while dear enough, is not yet so expensive as oak, though the cost of that pine has gone up very much of late.

When the board is made much thicker and wider at the base than at the end, this tapering shape gives it much greater strength where it is liable to break—at the shoulder—and at the same time gives spring with power, and the board is not waving up and down when the swimmer is landing for the final jump.

The three piece spring board made of oak, and the many piece spring board made of hickory are well worthy of consideration, because they are cheaper; and warping does not take place in the three piece oak.

The thick oak boards that only a man well over the two hundred pound weight can spring are to be condemned, as spring board diving contests on them are a very sad disappointment to the visiting team, and the visitors would have to learn the art all over again before accustoming themselves to the lack of spring on the strange board.

Having a platform a yard above the spring board, where a long run cannot be made because of the shortness of the space, is a good idea, as such would enable the diver to make a powerful descent from the upper to the lower board and thus secure a splendid send-off for a dive.

The cover for spring boards, placed on so as to prevent the slipping of the feet of the diver, had best be of thin rubber having the grooves running lengthwise, so as to drain the water completely off the board, and thus save the board for years of wear. Material other than rubber holds the water, rots and smells.

SUGGESTED PROGRAM FOR EXHIBITION SWIMMING

1. Undressing in the water. It is easier to do this by "walking" in the water, than by the old method of "treading".

THE CORSAN SYSTEM

2. Sculling. Swimming with the arms only. A safety method in emergency, such as when seized with cramp.
3. Steamboating. The easiest way to acquire the crawl or flutter kick.
4. Back Crawl. A stroke much easier for women to learn than is the front crawl.
5. Front Crawl. Learn the flutter or crawl kick, then Rhythmic Breathing, then the arm action, then do them all together.

---

6. Side Underarm Stroke, on either side, with scissors kick.
7. Side Overarm Stroke, on either side, with scissors kick.
8. Trudgeon Stroke with scissors kick.
9. Spiral Crawl.
10. Waltzing Crawl.
11. Trudgeon-Crawl Stroke, using both scissors and flutter kicks.
12. Pacing on the back.
13. Pacing on the front. A North American Indian Stroke, greatly exaggerated.
14. Broad Stroke on back, with frog kick.
15. Alternate Overarm on back, with frog kick.
16. Breast Stroke upside down. The only way it should be done.
17. Double Overarm. The old racing back Stroke. Frog Kick.
18. Double Overarm. Flutter or crawl kick.
19. Double Overarm. Alternating scissors kick.
20. Swimming with the left leg and left arm only. A stroke originated for a half-paralyzed man some years ago.
21. Russian style, with the scissors kick.
22. Swimming backwards, using reversed flutter kick.
23. Congo Stroke. Imitation of an alligator or crocodile cutting through the water. A stroke used in the Congo to slip across a river and kill the swimmers' enemies asleep in their boats.
24. The Bluegill, using the scissors kick.
25. The Crab.
26. Swimming with both feet high out of the water. A very difficult stunt.
27. Loop the Loop.
28. The Submarine, another exceedingly hard stunt.
29. Walking in the water. A stunt St. Peter couldn't do.
30. Macmonies' Fountain.
31. The Bicycle.

32. The Bicycle Backwards.
33. Swimming in a washtub, or the spinning top.
34. Catercorner.
35. The Racer's Turn. Four Styles.
36. The Circle-in.
37. The Wheel. A demonstration in rapid breathing.
38. The Porpoise and the Dolphin.
39. The Torpedo.
40. The Pendulum.
41. The Rolling Log.
42. The Propeller.
43. Backward and forward somersaulting.
44. Jumping high out of the water.
45. The Otter.
46. The Mudhole Crawl, an Indian woman's stroke.
47. The Muskrat.
48. The Dog Paddle.
49. How I learned to swim when I was six.
50. Imitation of the Breast Stroke—how I saw a man learning.
51. Swimming with both hands and feet tied.
52. Imitation of a man seized with cramp saving his own life.
53. Motionless floating.
54. Motionless sinking.
55. Imitation of a drowning man.
56. Towing 9 or 11 women.
57. Breaking away from various death clutches.
58. Towing with the scissors kick.
59. With the frog kick.
60. Shafer's method of resuscitation.
61. How to get rid of cramps.
62. How to get rid of water in the ear.

INDEX

Airplane dive, 68.
Alternate overarm with frog kick, 16.
Alternate overarm with scissors kick, 17, 24.
Arm action; alternate overarm, 15, 16, 17, 24; back crawl, 17, 18; back racing stroke, 17, 18; breast, 84, 87; broad stroke, 23; crawl, 29–35, 78, 80; double overarm, 24; "English," 25, 28; half-paralyzed, 21; in sculling, 14; racing-stroke-on-back, 17, 18; side overarm, 25, 28; side underarm, 25, 27; single overarm, 25; trudgeon, 30, 35, 36.
Art of teaching swimming, 133.
"Australian" crawl, 34.

Back crawl, 15, 17, 18, 84, 110.
Back dives, 45, 55, 65, 66, 67.
Back strokes, (see Strokes on back).
Basket polo, 123.
Bicycle, 111.
Bluegill, 110.
Breast stroke, 84, 87.
Broad stroke, 23.
Butterfly dive, 45, 58.

Cannon-ball dive, 45, 64.
Catch a live duck, 117.
Cavill, 36.
Children, 43, 44, 82–85.
Churn, 111.
Clocking races, 125.
Coaching for contests: dispersal of men, 77; massage, 81; racer's plunge, 70, 71, 72; racer's turn, 72, 77, 80; rehearsal, 79; selection of divers, 78; speed, 72–75, 79; start of the race, 79; training in diving, 45, 78, 130; type of coach, 76, 130; women in contests, 77.
Come-back or Isander dive, 45, 56, 57.
Co-ordination, (see Rhythmic breathing; also, Strokes).
Corkscrew dives, 45, 65, 66.
Crab, 110.
Cramps: stroke to use in case of, 14, 84.
Crawl kick, (see Flutter kick).
Crawl stroke, 25–35, 78, 80, 83, 84, 91, 110.

Dead man's float, 9.
Differences between men and women in swimming, 3, 9, 11, 12, 16, 17, 18, 20, 35, 70, 77, 86, 110, 111, 113, 116.
Dives: airplane dive banking, 68; back corkscrew, 45; back forward, 45, 66; back jack knife, 45, 61, 63; back somersault and dive, 45; back standing sitting, 45; back standing sitting standing, 45; back standing sitting standing forward entry, 45; backward screw, 65; butterfly, 45, 58; cannon-ball, 45, 64; come-back or Isander, 45, 56, 57; corkscrew, 45; dolphin, 45, 68; forward back, 45; forward screw, 63; forward somersault, 45, 63, 64; forward somersault and dive, (1½), 45, 49; forward somersault from back jack knife, 63; front jack knife, 45, 49, 50; gainer or Molberg, 45, 59, 60; half corkscrew, 66; hand stand, 45–48; hoochie-coochie, 45; leaping far out and back, 45; neck dive, 51; one-and-a-half and half twist with back entry, 45, 67; pilot, 45; plain, 50; plain back, 45, 55; scoring, 126, 130; side standing sitting, 45; Sol-Levi, 45; somersault and dive from trapeze, 62; standing sitting, 45; standing sitting standing, 45; swan, 45, 48, 52, 53, 54; three-in-one, 69.
Diving: instructions in, 45 et seq.; 78, 130; number in diving class, 45; depth required, (see Water; also Natatoriums).
Dolphin, 110, 111.
Dolphin dive, 45, 68.
Double overarm stroke, 24, 26.
Drowning: causes of, 1; causes of women drowning, 3, 9.

Elementary: instruction, 4–12, 14, 15, 38–44, 82–85; strokes, 14, 15, 84.
"English" overarm, (see Side overarm).
Entering the water, methods of: 4, 39, 70, 133.
Exhibition, (see Program of Exhibition of Swimming).

Fear, elimination of: by opening the eyes, 10; by rhythmic breathing, 4 et seq.; drill, 4 et seq.; 38–44; in teaching crawl foot action, 28; relation to muscle action, 4.
Fisher, George J., M. D., (see Introduction).
Floating: men in fresh water, 12; women, 9, 11.
Flutter kick: description of, 16, 25–28, 34, 35, 39, 41, 83,; uses of, 15, 18, 26, 27, 34–37, 70, 72, 78, 89, 90.
Forward somersaults, 45, 63, 64.
Frog kick: description of, 18–20; uses of, 16, 23, 24, 27, 40, 91, 94, 97, 99, 101.
Front strokes, (see Strokes on front).

Gainer or Molberg dive, 45, 59, 60.

Half-paralyzed stroke, 21.
Handicap races, 115.
Hand stand dive, 45–48.
History of swimming, 21, 22, 36.
Hoochie-coochie dive, 45.
Horizontal rhythmic breathing practice, 4–7, 39, 83.
How to: break away from being clutched, 92 et seq.; float in fresh water, 12; get your feet on the bottom, 9; swim downward, 92; swim with cramps, 14; swim with your clothes on, 16, 92.
Hurry-scurry race, 116.

Instructors: character of, 76; method of living, 76, 134; type, 76; women as, 90.
Isander dive, 45, 56, 57.

Jack knife dives, 45, 49, 50, 61, 63.

Kicks, (see Leg action; see also Flutter kick, Frog kick, Scissors kick).

"Lancaster" kick, 36.
Land drill, 30, 31.
Leg action: crawl, (see flutter); flutter kick, 15, 16, 18, 26–28, 34–37, 39, 41, 70, 72, 78, 83, 89; frog kick, 16, 18–20, 23, 24, 27, 40, 91, 94, 97, 99, 101; "Lancaster," 36; scissors kick, 17, 19, 21–25, 27, 28, 36, 41, 75, 90, 120; left-handed scissors kick, 19, 22, 41; right-handed scissors kick, 19, 21, 41.
Life saving, 20; breathing, 94, 100; drill, 92 et seq.; 116; how to swim in clothes, 16, 92; race, 116; release methods, 92–98, 100; removing coat in water, 93; resuscitation, 102–105; Shafer method of resuscitation, 103–104; strokes to use, 93, 94, 97, 99, 100, 101; with Shepherd's crook, 102, 155; wrong methods, 99, 101.

Massage, 81.
Mass Instruction, 6–8, 12, 15, 16, 21, 22, 25–27, 30, 31, 35, 38, 41, 43, 133, (see also Introduction).
Meets: clocking races, 125; dispersal of men, 77; exhibition (see Program of Exhibition of Swimming); management, 124; massage, 81; method of scoring dives, 126–130; natatorium, 124; proficiency ability test table, 125; program, 124; rehearsal, 79; seating, 124; (see also Water Sports); selection of divers, 78; smoking, 124; some records of swimmers, 131, 132; stunts, (see chapter on Stunt Swimming); swimming pool records, 130; tickets and business, 124; training, 134 et seq., (see also Coaching, Speed Swimmers' Drill, racer's plunge, racer's turn); women in contests, 77.
Mills, Captain, 104.
Molberg dive, 45, 59, 60.
Motionless sinking stunt, 11.
Muskrat, 107.

Natatoriums: 124, 148–156; air and ventilation, 149, 150; colour, 154; depth, 152, (see also Water); exposure, 149, 151, 154; gallery, 152, 155; heating, 149, 150, scum trough, 151; showers, 151, 154; size, 148, 152, 154, 155, (see also Water); spring board, 155; water, 150, 151, 153.
Neck dive, 51.

Obstacle race, 116.
Old Clothes race, 116.
Otter, 108.

Perpendicular rhythmic breathing practice, 5–7, 11.
Physical types discussed, 2, 9, 16–18, 20, 21, 27, 30, 33–38, 62, 70, 75, 77, 80.
Pick-a-back wrestling, 117.
Pilot dive, 45.
Plain dive, 50.
Pools, (see Natatoriums).
Porpoise, 109.
Proficiency ability test table, 125.
Program for Exhibition Swimming, 156.
Propeller, 106, 108.
Push off and drift, 9, 10.

Racer's plunge, 70–72, 133.
Racer's turn, 72–75, 80.
Races, (see Water Sports, Meets, Speed swimming).
Racing-stroke-on-back, (see Back Crawl).
Records, (see Meets).
Relaxation, 5, 38, 43.
Relay race, 114.
Resuscitation, 103, 104.
Revolving trudgeon, 37.
Rhythmic breathing: best way to open the mouth, 9; horizontal rhythmic breathing practice, 4–7, 39, 83; initial excercises in, 4–6, 39, 83; in life saving, 94, 100, 101; in stunts, 108 et seq.; on beginning of a race, 79; on racer's plunge, 70; on racer's turn, 74, 78, 80; perpendicular rhythmic breathing practice, 5–7, 11; rotary rhythmic breathing practice (see Horizontal rhythmic breathing); with crawl, 31, 33; with crawl foot action, 16, 39, 41, 70; with frog kick, 20; with strokes, 29; with trudgeon, 36.
Rolling crawl, 36, 113.
Rotary rhythmic breathing practice, (same as horizontal).
Rules: 77, 115; Canadian Water Polo Rules, 120; Olympic Water Polo Rules, 122; (see Meets).

Scissors kick: description of, 19, 21–23, 41, 75; uses of, 17, 21, 22, 24, 25, 27, 28, 36, 37, 41, 90, 120.
Sculling, 14, 39, 84, 93, 102, 106, 109.
Sea serpent race, 116.
Shafer, 102.
Shepherd's crook, 102, 155.
Shore drill, 4–6, 16, 19, 21, 22, 30, 35, 38–42.
Side overarm, 25, 28.
Side strokes, (see Strokes on side).
Side underarm stroke, 25, 27, 84.
Single overarm stroke, 22, 25.
Smoking, 125.
Sol-Levi dive, 45.
Some records of swimmers, 130–132.
Speed swimming, 15, 33, 70, 72–75, 78–81.
Spiral strokes, 36, 37; rolling crawl, 36, 113; revolving trudgeon, 37; waltzing crawl, 37, 113.
Standing sitting dives, 45.
Steamboat-on-back, 15.
Strokes: 14–37, (in order of difficulty); elementary, 14, 15, 84; fastest, 15, 33; *on back:* 14–27 (in order of difficulty); sculling, 14–16, 39, 84, 94, 102, 106, 109; steamboat-on-back, 15; back crawl, 15–18, 84, 110; racing-stroke-on-back, (see Back crawl); alternate overarm with frog kick, 16; alternate overarm with scissor kick, 17, 24; half-paralyzed, 21; single overarm, 22, 25; double alternating overarm, 22; broad stroke, 23; double overarm, 24, 26; *one side:* 27–29, (in order of difficulty); side underarm, 25, 27, 84; side overarm, 25, 28; "English" overarm, see Side overarm); *on front:* 31–36, (in order of difficulty); crawl, 25–35, 78, 80, 83, 84, 91, 110; trudgeon, 35, 36, 90, 120; trudgeon-crawl, 36, (for breast see 84, 87); *spiral,* (see Spiral strokes).
Stunts: *Animal and fish imitations:* bluegill, the, 110; crab, the, 110; dolphin, the, 110, 111; muskrat, the, 107; otter, the, 108; porpoise, the, 109; *Bicycle, the,* 111; *Churn, the,* 111; *Crawl Three Style Medley Race,* 113. *Double Somersault,* 108. *Remarks,* 113. *Sculling Feats:* propeller, the 106, 108; sculling feet first on back, 14, 106; sculling with both feet high out of the water, 106; swimming in a wash tub, 106; torpedo, the, 106, 108. Swimming with hands and feet tied, 107. Submarine, the, 109. Tandem back crawl, 110. Tandem crawl, 110. Waltzing in the water, 113. Wheel, the, 112.
Submarine, the, 109.
Swan dive, 45, 48, 52, 53, 54.
Swimming records, (see Meets).
Swimming, instructions in: coaching for contests, 76, 134; crawl drill in pool, 43, 44; elementary, 4–12, 14, 15, 38–

44, 82–85; elimination of fear, 4–6, 28, 133; land drill, 30, 31; mass instruction, 6–8, 12, 15, 16, 21, 22, 25–27, 30, 31, 35, 38, 41, 43, 133; methods and strokes adapted to various physical types, 2, 9, 16–18, 20, 21, 27, 30, 33–38, 62, 70, 75, 77, 80; number in swimming class, 6, 8, 15, 25, 30, 41, 43, 71, 85, 133; reasons for, 1, 86, 114, 139, (see also The Art of Teaching Swimming); shore drill, 38–41; speed swimmer's drill, 72; teaching children, 82; use of water wings, 12, 18, 25–29, 31, 34, 39, 44, 84.

Swimming, theory of: body in water, 7, 70; hands, 4, 30, 73; men and women floating, 9, 11; position of body, 10, 26, 70; pressure, 12, 25, 31–33; (see also Arm action, co-ordination, Leg action, Physical types, Rhythmic breathing, Strokes, Therapeutic value of swimming, Women).

Tandem crawl, 110.

Tandem race, 110, 117.

Teaching children, 43, 44, 82–85.

Terminology of swimming, 15, 25, 26, 28, 29, 118, 130.

"Timing" the crawl, 33, 34, 78.

Therapeutic value of swimming, 25, 26, 30, 88–91, 133–147, (see also the Introduction).

Three-in-one dive, 69.

Tom-Tom-pull-away, 117.

Torpedo, the, 106, 108.

Training, 134 et seq., (see also Coaching for Contests).

Trudgeon, 35, 36, 90, 120.

Trudgeon-crawl, 36.

Waltzing crawl, 37, 113.

Waltzing in the water, 113.

Water: condition of, 4, 43, 83, 133, 152; depth best for elementary instruction, 4, 8, 28, 43, 83, 85, 87, 133, 152; depth required for diving, 85, 152; instruction, relation of depth of water to elementary breathing instruction, 11, 83; space required, 43, 85, 114, 117, 152; temperature of, 4, 43, 44, 83, 114, 133, 150, 153.

Water base ball, 117.

Water hockey, 123.

Water polo, 118–122, 155.

Water Sports: basket polo, 123; catch a live duck, 117; handicap races, 115; hurry-scurry race, 116; life saving race, 116; obstacle race, 116; old clothes race, 116; pick-a-back wrestling, 117; relay race, 114; sea serpent race, 116; (see also Meets); size of pool, 148, 152; tandem race, 110, 117; temperature of water, 114; Tom-Tom-pull-away, 117; water base ball, 117; water hockey, 123; water polo, 118–122, 155.

Water-wings: use of, 12, 18, 25–29, 31, 34, 39, 44, 84.

Wheel, the, 112.

Women, characteristics of as swimmers, 3, 9, 11, 12, 16, 17, 18, 20, 35, 70, 77, 86, 110, 111, 113, 116.

23500
796

Date Due

DEC 11
DEC 16 '46
APR 13
APR 16 1957
MAY 29 1957
OCT 30 1957
JAN 6 1960
APR 26 '61
MAY 10 '61
MY 15 '63
DE 1 '72

23500

GV837
.C82

ST. OLAF COLLEGE
GV837 .C82
Corsan, George - The diving and swimming book, by
3 0111 00176 0916